



Workflow Toolkit and Lessons in User Centered Design

Pascale Carayon, PhD

Ben-Tzion (Bentzi) Karsh, PhD

Industrial & Systems Engineering

Center for Quality and Productivity Improvement

University of Wisconsin

Goals of the toolkit



- Help small and medium sized practices to
 - Analyze their workflows in preparation health IT implementation
 - Improves workflows during and post implementation
 - Use health IT to further improve workflows

Support activities



- Technical expert panel
- Request for Information
- Literature Review
- Environmental Scan
- User centered design?*

Lessons in user centered design



- A lot of talk about usability
- All of us are designing *tools*, for some *users*, to accomplish *goals*
- So all of us *should be* using user centered design processes



Designs are hypotheses
about how artifacts affect
cognition

David Woods

Who are the users?



- Small and medium sized practices
 - Physician champions
 - Practice managers
- Regional Extension Centers
- Two levels of expertise
 - Beginners
 - Advanced



Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS

http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp

File Edit View Favorites Tools Help

Google Search Share Sidewiki Check Translate AutoFill Sign In

Health IT Toolkit

Workflow Integration Toolkit for Health IT

Advanced Search

Workflow 101 Tools 101 Selected User Stories

- Home
- Advanced Workflow
- Advanced Tools
- Advanced User stories
- FAQs
- Links

The key to successful implementation of **health information technology (health IT)** is to recognize its impact on both clinical and administrative **workflow**. Once implemented, health IT can provide information to help you reorganize and improve your workflow.

This toolkit is designed for people and organizations interested or involved in the planning, design, implementation and use of health IT in ambulatory care. The toolkit can help these individuals and organizations by providing resources to better understand:

- what workflow is and why it must be incorporated in planning, design, implementation and use of health IT; [more](#)
- what tools are available to use when assessing workflow; [more](#)
- the impact of health IT on workflow as experienced by clinical practices; [more](#)
- the research on how health IT implementation affects workflow; [more](#)
- how health IT can be used to assess and improve workflow; [more](#)

Trusted sites 100%

start | Inbox - Microsoft Out... | Re: web based form -... | Health IT Toolkit - Wi... | 9:54 AM

Users?



- REC staff did not exist at the time -so who are they and what do they know?
- What is “advanced” and what is “beginner”?
 - In implementation experience?
 - In stage of implementation?
 - Years of using health IT?
 - In workflow analysis?
 - Can they self-select?
- What about other users?
 - Vendors?
 - Curriculum developers?

User goals



- Learn about workflow and its importance
- Learn how to analyze workflows
- Learn state of evidence regarding workflow and health IT success

Learn about workflow and importance

A screenshot of a Windows Internet Explorer browser window displaying the Health IT Toolkit website. The browser's address bar shows the URL: http://128.104.193.65:8995/integtest1-Project1-context-root/faces/test.jsp?view=showWorkflow101.jsp#C. The website header includes the title "Health IT Toolkit for Health IT" and a search bar. The main content area is titled "Workflow 101" and contains a list of bullet points about workflow. The browser's taskbar at the bottom shows several open applications, including Microsoft Excel, AA toolkit link, RE: screen shots..., Microsoft Power..., Health IT Toolkit, and Document1 - Mic... The system tray shows the time as 11:42 AM and the date as 10/10/2010.

Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS

http://128.104.193.65:8995/integtest1-Project1-context-root/faces/test.jsp?view=showWorkflow101.jsp#C

File Edit View Favorites Tools Help

Google Search Share Sidewiki Check Translate AutoFill Sign In

Health IT Toolkit

Workflow Integration Toolkit for Health IT

Advanced Search

Workflow 101 Tools 101 Selected User Stories

Home

Advanced Workflow

Advanced Tools

Advanced User stories

FAQs

Links

Home » Workflow 101

- What is workflow?

Workflow is the sequence of physical and/or mental tasks performed by various people over time and through space. It can occur at different and /or multiple levels (e.g., one person, between people, across organizations) & can occur sequentially and / or simultaneously.

- What must I consider when I think about workflow?
- Why is it important to assess workflow?

Anytime you make a change to your practice, ESPECIALLY when implementing Health IT, the workflow associated with clinical & practice management processes will change.

- What are consequences of NOT analyzing workflow?
- How do I analyze workflow?
- Who should collect & analyze workflow?
- When should I assess workflow?

[More on Workflow]

start Microsoft Excel - ... AA toolkit link - ... RE: screen shots... Microsoft Power... Health IT Toolkit ... Document1 - Mic... Internet 100% 11:42 AM

Learn about ways to analyze workflow



Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS

http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp?view=showTools101.jsp

File Edit View Favorites Tools Help

Google Search Share Sidewiki Check Translate AutoFill Sign In

Health IT Toolkit

Workflow Integration Toolkit for Health IT

Workflow 101 Tools 101 Selected User Stories

Home
Advanced Workflow
Advanced Tools
Advanced User stories
FAQs
Links

Home >> Tools 101

Although there are many different tools you can use to collect & analyze workflow information, the following tools, appropriately used, will be extremely useful in helping you better understand current workflows & modify current or design new workflows that will make it easier to use your health IT.

Tool Name	Description
Check Sheet	A check sheet is a table or form used for registering data as they are collected. It is a simple, generic tool that canmore
Flowchart	A diagram that uses graphical symbols to depict the flow of the steps in a process.....more
Usability	A usability evaluation is a tool for determining the extent to which a system is easy to use or "user friendly".....more

[More Tools]

start | Inboxes - Microsoft Out... | Re: web based form -... | Health IT Toolkit - Wi... | screen shots 5-24-10... | Trusted sites | 100% | 9:59 AM

User goals?



- What users thought *workflow* meant, and therefore expected to learn about was all over the map.
- Our simple *tools* embedded our own assumptions – users still would not know what to use the tools for or how

Users' needs to achieve goals



- ❑ Need to know what tools are available
- ❑ How they have been used by others
- ❑ Where to learn how to use them
- ❑ Strengths and weaknesses of the tools



Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS

http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp?view=showTools.jsp

File Edit View Favorites Tools Help

Google Search Share Sidewiki Check Translate AutoFill Sign In

Health IT Toolkit

Workflow Integration Toolkit for Health IT

Workflow 101 Tools 101 Selected User Stories

- Home
- Advanced Workflow
- Advanced Tools**
- Advanced User stories
- FAQs
- Links

Home » Advanced Tools

The more than 100 tools included in this compendium are grouped to at least one of twelve categories based on what they are used for. For example, tools such as flowcharts are a means of "process mapping", check lists are a type of "data collection" tool, histograms provide "data display/organization", and focus groups are of source of "idea generation". By first selecting a category on this page, you then are provided a list of tools - and their short descriptions. Details on each tool - including steps on how to use the tool, examples of the tool's use as found in published papers and/or user stories, and more - can then be obtained by selecting the specific tool you wish to learn more about.

[Data Collection](#) | [Data Display / Organization](#) | [Idea Creation](#) | [Proactive Risk Assessment](#) | [Problem Solving](#) | [Process Improvement](#) | [Process Mapping](#) | [Project Planning / Management](#) | [Statistical](#) | [Task Analysis](#) | [Usability](#) | [Health IT](#)

http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp?view=showTools.jsp

start | Inbox - Microsoft Out... | Re: web based form -... | Health IT Toolkit - Wi... | screen shots 5-24-10... | 10:02 AM



Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS

http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp

File Edit View Favorites Tools Help

Google Search Share Sidewiki Check Translate AutoFill Sign In

Health IT Toolkit

Workflow Integration Toolkit for Health IT

ehr search
Advanced Search

Workflow 101 Tools 101 Selected User Stories

Home
Advanced Workflow
Advanced Tools
Advanced User stories
FAQs
Links

Home » Advanced Tools » Data Collection

Although there are many different tools you can use to collect & analyze workflow information, the following tools, appropriately used, will be extremely useful in helping you better understand current workflows & modify current or design new workflows that will make it easier to use your health IT.

Tool Name	Description
Backlog Reduction Worksheetmore
Balanced Scorecard	The balanced scorecard suggests that we view the organization from four perspectives, and to develop metrics, collect da.....more
Check Sheet	A check sheet is a table or form used for registering data as they are collected. It is a simple, generic tool that canmore
Cognitive Task Analysis	The purpose of cognitive task analysis is to capture the way the mind works, to capture cognition. The researcher or pra.....more
Cognitive Walkthrough	The cognitive walkthrough method is used to evaluate user interface usability. The main driver behind the development of.....more
Focus Group	A focus group brings together up to a dozen people to discuss their attitudes and concerns about a subject.....more
Interview	Interviews collect data (generally qualitative) from a targeted group of people about their opinions, behavior, or knowl.....more

Done Trusted sites 100%

start Inbox - Microsoft Out... Re: web based form -... Health IT Toolkit - Wi... screen shots 5-24-10... 10:02 AM



Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS

http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp

File Edit View Favorites Tools Help

Google Search Share Sidewiki Check Translate AutoFill Sign In

Health IT Toolkit

Workflow Integration Toolkit for Health IT

Workflow 101 Tools 101 Selected User Stories

- Home
- Advanced Workflow
- Advanced Tools
- Advanced User stories
- FAQs
- Links

Home » Advanced Tools » Data Collection » Details

REFERENCES

Brownbridge, G., A. Evans, M. Fitter and M. Platts (1986). "An interactive computerized protocol for the management of hypertension: effects on the general practitioner's clinical behaviour." *Journal of the Royal College of General Practitioners* 36(286): 198-202.

ABSTRACT

This paper reports an experimental study of general practitioners' use of an interactive computerized protocol for the management of hypertension, focussing particularly on the protocol's effects on doctors' clinical behaviour. Prior to its computerization a paper-based version of the protocol was used enabling a comparison of the alternative forms. Doctors' delivery of care was assessed from video recordings of 89 consultations and from the records made during these consultations. Comparisons were made of consultations conducted under control and experimental conditions. Use of paper and computer protocols resulted in significant improvements in the doctors' delivery of care, in terms of the range of verbal and physical examinations conducted and recorded. The protocol's effects were most marked when the computerized version was used. However, use of the computer protocol resulted in the recording of information on the non-occurrence of certain events which had not been explicitly elicited during the verbal examination; features of the design which were intended to encourage adherence to the protocol resulted in the recording of unsubstantiated information. It is concluded that the detail of the verbal examination suggested by the protocol may have been inappropriate to the realities of a general practice consultation. The findings provide some useful insights for the design of future computerized protocols for the management of chronic conditions.

OBJECTIVE

To report an experimental study of general practitioners' use of an interactive computerized protocol for the management of

start | Inboxes - Microsoft Out... | Re: web based form -... | Health IT Toolkit - Wi... | screen shots 5-24-10... | 10:03 AM

User needs?



- Our initial design allowed a user to *learn about*. New design will let them *learn how*.
- It did not take into account potential time constraints of user in actual practice
- Small and medium sized practices may not have the resources to invest in this kind of learning

User centered design – devil is in the details



- ❑ User centered design is *NOT* asking users what they want and giving it to them
- ❑ User centered design is *NOT* designing something, showing it to users and asking “so does this make sense?” / “do you like it?”
- ❑ User centered design is *NOT* usability
- ❑ Knowledge about performance and skill to execute UCD is critical

UCD from Mockup to Real Use



- Rapid cycle of user feedback, evaluation, and redesign
- Differences between simulated use and actual use
- Updates
 - Development vs. maintenance
 - User involvement
 - Changing users and user needs



Next hypothesis

- Redesign website to be action oriented, right from the homepage
 - [Click here to start analyzing your workflow](#)
 - [Click here to learn how to improve you existing workflows](#)

- Make materials readily available
 - [Click here to get workflow training materials](#)
 - [Click here for workflow curriculum presentations](#)

Larger Challenge



- Users *need to know a whole*. Each of our toolkits gives a *part*. [sound like clinical needs and health IT?]
- Bigger question for all of the toolkits is *how do we help users to integrate* over all of the toolkits to get something useful?

Thank you
http://cqpi.engr.wisc.edu/withit_home

THE UNIVERSITY OF WISCONSIN - MADISON



July 26-30, 2010
 Pyle Center, University of Wisconsin-Madison

Systems Engineering Initiative for Patient Safety (SEIPS)
SEIPS Short Course on Human Factors Engineering and Patient Safety
Part I and Part II on Health IT

This two-part, five-day course for professionals presents nationally recognized speakers discussing a variety of Patient Safety topics and Human Factors Engineering (HFE) including:

<p>Part I: The Basics of HFE & Patient Safety</p> <ul style="list-style-type: none"> • Human Factors Engineering • Sociotechnical Systems and Microergonomics • Design of the Physical Environment and Ergonomics • Cognitive ergonomics • And more... 	<p>Part II: HFE & Health Information Technology</p> <ul style="list-style-type: none"> • Usability of Health IT • Impact of Health IT on Patient Care Processes • Human Factors of Implementing Health IT • And more...
--	--

For short course schedule and registration information go to: http://cqpi.engr.wisc.edu/shortcourse_home

Jointly sponsored by the University of Wisconsin-Madison Center for Quality and Productivity Improvement (CQPI) and the University of Wisconsin School of Medicine and Public Health, Office of Continuing Professional Development in Medicine and Public Health

Advanced Workflow (provides guided search of lit review Access database – & may contain user stories if any apply to fields selected)



Workflow Integration Toolkit for Health IT

Home Workflow 101 Tools 101 Selected User Stories

Home
Advanced Workflow
Advanced Tools
Advanced User stories
FAQs
Links

Home >> Advanced Workflow

TECHNOLOGY	CLINIC	TOOL
<input type="checkbox"/> EHR / EMR	Size	<input type="checkbox"/> flowcharting
<input type="checkbox"/> e-prescribing	<input type="checkbox"/> small	<input type="checkbox"/> Checklists
<input type="checkbox"/> decision support	<input type="checkbox"/> medium	<input type="checkbox"/> usability
<input type="checkbox"/> alerts and reminders	<input type="checkbox"/> large	<input type="checkbox"/> observation
<input type="checkbox"/> other technologies	<input type="checkbox"/> any size	<input type="checkbox"/> focus groups
<input type="checkbox"/> all technologies	Location	<input type="checkbox"/> interviews
	<input type="checkbox"/> Urban / Suburban	<input type="checkbox"/> other tools
	<input type="checkbox"/> Rural	<input type="checkbox"/> all tools
	<input type="checkbox"/> both	
	Type of Practice	
	<input type="checkbox"/> Primary Care	

Advanced Workflow – Search Results (provides reference & objective for each paper/user story; select **more** and directed to detail of respective output)



A screenshot of a web browser displaying the Health IT Toolkit application. The browser's address bar shows the URL: http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp. The page title is "Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS". The main content area features a header with the text "Workflow Integration Toolkit for Health IT" and a search bar containing the text "ehr". Below the header, there are navigation tabs for "Workflow", "User Stories", and "Tools", with "User Stories" currently selected. The main content area displays "REFERENCES OBJECTIVE". A left sidebar contains a menu with links: Home, Advanced Workflow, Advanced Tools, Advanced User stories, FAQs, and Links. The bottom of the browser window shows the Windows taskbar with the Start button and several open applications, including "Inbox - Microsoft Out...", "Re: web based form -...", "Health IT Toolkit - Wi...", and "screen shots 5-24-10...". The system tray shows the time as 10:02 AM.

Advanced User Stories



Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS

http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp?view=showCase.jsp

File Edit View Favorites Tools Help

Google Search Share Sidewiki Check Translate AutoFill Sign In

Health IT Toolkit

Workflow Integration Toolkit for Health IT

Workflow 101 Tools 101 Selected User Stories

Home
Advanced Workflow
Advanced Tools
Advanced User stories
FAQs
Links

Home >> Advanced User Stories

Throughout the design of this toolkit we encountered individuals responsible for or heavily involved in health IT installations from medical practices of varying size, scope, and location. You can read all of their "stories" by selecting SEARCH at the bottom of this page or you can refine your search by selecting one or more options from each of the categories listed here. Subsequently you will be provided a list of summaries for each of the relevant stories; detailed stories can then be read by selecting a specific story you wish to read more about.

TECHNOLOGY	CLINIC
<input type="checkbox"/> EHR / EMR	Size
<input type="checkbox"/> e-prescribing	<input type="checkbox"/> Small
<input type="checkbox"/> Decision Support	<input type="checkbox"/> Medium
<input type="checkbox"/> Alert and Reminder	<input type="checkbox"/> Large
<input type="checkbox"/> Other technologies	Location
	<input type="checkbox"/> Urban / Suburban
	<input type="checkbox"/> Rural
	Type of Practice

Trusted sites 100%

start | Inbox - Microsoft Out... | Re: web based form -... | Health IT Toolkit - Wi... | screen shots 5-24-10... | 10:03 AM

Advanced User Stories – Search Results (provided reference, summary and more)



A screenshot of a Windows Internet Explorer browser window. The address bar shows the URL: http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp. The browser's search bar contains the text 'ehr'. The page content includes a header for 'Workflow Integration Toolkit for Health IT' with a search bar containing 'ehr' and a 'search' button. Below the header, there are navigation links: 'Workflow 101', 'Tools 101', and 'Selected User Stories'. The main content area shows a breadcrumb trail: 'Home >> Advanced User Stories >> Search Results'. There are three tabs: 'Workflow', 'User Stories', and 'Tools'. Below the tabs, the text 'REFERENCES OBJECTIVE' is visible. The browser's status bar at the bottom shows 'Done', 'Trusted sites', and '100%' zoom. The Windows taskbar at the very bottom shows the 'start' button and several open applications: 'Inbox - Microsoft Out...', 'Re: web based form -...', 'Health IT Toolkit - Wi...', and 'screen shots 5-24-10...'. The system clock shows '10:04 AM'.

FAQs



Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS

http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp?view=showFAQ.jsp

File Edit View Favorites Tools Help

Google Search Share Sidewiki Check Translate AutoFill Sign In

Health IT Toolkit

Workflow Integration Toolkit for Health IT

ehr search
Advanced Search

Workflow 101 Tools 101 Selected User Stories

- Home
- Advanced Workflow
- Advanced Tools
- Advanced User stories
- FAQs
- Links

Home >> FAQs

Frequently Asked Questions

Why doesn't this toolkit contain examples of the workflow changes that I can expect ?

[How do I choose a vendor?](#)

http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp?view=showFAQ.jsp#B

start | Inboxes - Microsoft Out... | Re: web based form -... | Health IT Toolkit - Wi... | screen shots 5-24-10... | 10:04 AM

Links



Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS

http://128.104.193.65:8995/integtest1-Project1-context-root/faces/test.jsp?view=showLinks.jsp#D

File Edit View Favorites Tools Help

Google Search Share Sidewiki Check Translate AutoFill Sign In

Health IT Toolkit

Workflow Integration Toolkit for Health IT

Advanced Search

Workflow 101 Tools 101 Selected User Stories

- Home
- Advanced Workflow
- Advanced Tools
- Advanced User stories
- FAQs
- Links

Home » Links

1. Costs and Benefits of (Pediatric) Health Information Technology
2. Doctor's Office Quality - Information Technology (DOQ-IT)
3. American Academy of Family Physicians: The Center for HIT
4. American College of Physicians: Health Information Technology

The website has an HIT section that focuses on EHR, e-Prescribing, and Physician Quality Reporting Initiative (PQRI). Regarding the EHR, there is a lot of information on implementing it, including a link to an Advance Planning & Workflow Analysis, however it is accessible only to ACP members.

Sources:

- http://www.acponline.org/running_practice/technology/
- http://www.acponline.org/running_practice/technology/ehr/roadmap/ehr.htm#inst
- http://www.acponline.org/running_practice/pcmh/help.htm

5. Health Information Technology for Improving Quality of Care in Primary Care Settings

Internet 100%

start Microsoft Excel - user... Microsoft Office O... Microsoft PowerPoint ... Health IT Toolkit - Wi... Document1 - Microsof... 12:33 PM



-
- Define users
 - Determine goals
 - Identify user cognitive work needs to achieve goals
 - Design
 - Test with cognitive walkthroughs
 - Revise design
 - Test with use cases and measure outcomes
 - Revise
 - Field test
 - Revise

Search Results (enter key word in "search" box on home page)



The screenshot shows a Windows Internet Explorer browser window displaying the Health IT Toolkit website. The address bar shows the URL: <http://fpm1552.fpm.wisc.edu:8995/integtest1-Project1-context-root/faces/test.jsp>. The page title is "Health IT Toolkit - Windows Internet Explorer provided by UW Madison - AIMS".

The main content area displays the "Workflow Integration Toolkit for Health IT" header. A search box in the top right corner contains the text "ehr" and a "search" button. Below the search box, the text "Advanced Search" is visible.

The page navigation includes "Workflow 101", "Tools 101", and "Selected User Stories".

The left sidebar contains a navigation menu with the following items: Home, Advanced Workflow, Advanced Tools, Advanced User stories, FAQs, and Links.

The main content area shows "Home > Search Results". Below this, there are tabs for "Workflow", "User Stories", and "Tools". The "Workflow" tab is selected.

The search results are organized into two columns: "REFERENCES" and "OBJECTIVE".

REFERENCES	OBJECTIVE
Carayon, P., Smith, P., Hundt, A.S., Kuruchittham, V., Li, Q., 2009. Implementation of an electronic health records system in a small clinic: the viewpoint of clinic staff. <i>Behaviour & Information Technology</i> 28 (1), 5-20.	"To examine the implementation of an electronic health records (EHR) system in a small family practice clinic" in order more
Simon, S.R., Kaushal, R., Cleary, P.D., Jenter, C.A., Volk, L.A., Orav, E.J., Burdick, E., Poon, E.G., Bates, D.W., 2007. Physicians and electronic health records - A statewide survey. <i>Archives of Internal Medicine</i> 167 (5), 507-512.	To address the barriers to Electronic Health Records adoption, particularly with regards to how physicians use EHR syst..... more

The browser's taskbar at the bottom shows several open applications: "start", "Inbox - Microsoft Out...", "Re: web based form - ...", "Health IT Toolkit - Wi...", and "screen shots 5-24-10...". The system tray on the right shows the time as 10:00 AM and the date as 10/24/10.

Advanced Search (choice located below search box) – provides fields from which to choose; final output looks same as when use “search”

