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Are web-based platforms to support quality improvement feasible in developing countries? *Experiences from Ecuador, Honduras, Nicaragua, and Rwanda*

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Objective: A key driving force to motivate change and accelerate adoption of innovations in health care improvement collaboratives is the ongoing exchange of ideas and results across participating teams, who often work for different organizations in dispersed locations. To facilitate the sharing of results and adoption of innovations among facility-based teams participating in collaboratives in developing countries, we implemented two different web-based platforms designed for use by health care providers and program managers in one African and three Latin American countries.

Methods: In 2003, the USAID-funded Quality Assurance Project (QAP) began exploring the feasibility of a web-based platform to enable teams engaged in QAP-supported improvement collaboratives in developing countries to share data and short reports on innovations and changes made to specific systems of care. A feasibility study showed that over half the teams in a three-country collaborative in Latin America had regular Internet access. QAP had several collaboratives in Rwanda, whose extensive IT infrastructure made a web-based system potentially feasible.

QAP's late 2003 solicitation for a custom-designed, web-based platform capable of supporting teams working in different languages generated no affordable bids. In 2004 we purchased off-the-shelf, server-based intranet software and contracted with the manufacturer to customize it, at modest expense, to meet most of our desired specifications, including the ability to dynamically display data graphically or in table form and support languages other than English. The scope of work for the custom programming was finalized in September 2004 and the work itself in February 2005. The **QAP Collaboratives Extranet** was launched in June 2005.

While the initial solicitation for customized software was underway, our Ecuador office pursued another strategy to meet its immediate need for a web-based platform to support a collaborative with teams in Ecuador, Honduras, and Nicaragua. After determining that a website in Spanish could be programmed relatively inexpensively in Ecuador, a local firm was hired to do so. In about three months, the **Mortalidad Materna** website was launched with password-protected areas where teams could post and view Excel and Word files with improvement data and reports.

Design Features: Two Web-based Platforms for Sharing Data and Reports

Feature	<i>Maternidad Materna</i> website	QAP Collaboratives Extranet
Security	<ul style="list-style-type: none"> • Site home page is open access • Access to the improvement data for each team is password-protected • Uploading a team's files requires the team's username and password 	<ul style="list-style-type: none"> • Extranet home page is open access • Access to pages of each collaborative is password-protected • Only members of a particular collaborative can enter its pages • Site administrator assigns new users rights to view data of specific collaboratives
Allows entry of data and reports by individual teams	<ul style="list-style-type: none"> • Team members or supervisors can upload Excel and Word files to the site • The website manager reviews all submitted files and approves them before they are posted to the website 	<ul style="list-style-type: none"> • The extranet houses sub-sites for individual collaboratives • Each collaborative has a home page and a team page for each facility-based team • Indicator data and reports are entered through forms on a team's own page

Feature	Maternidad Materna website	QAP Collaboratives Extranet
		<ul style="list-style-type: none"> Teams have access only to the collaborative home page and their team page (but not to the team pages of other teams)
Ability to view data and reports of other teams	<ul style="list-style-type: none"> Any user with a valid username and password can view any team's data and reports 	<ul style="list-style-type: none"> Any user with assigned rights to a particular collaborative can view any team's data and reports
Ability to add new indicators	<ul style="list-style-type: none"> Because data are contained within Excel files and not housed in a database on the site, new indicators may be added at any time 	<ul style="list-style-type: none"> New indicators can be added by a site administrator
Ability to add new teams	<ul style="list-style-type: none"> The site administrator can add new teams 	<ul style="list-style-type: none"> New teams can be added by a site administrator
Ability to add new collaboratives	<ul style="list-style-type: none"> The site was designed for only one collaborative 	<ul style="list-style-type: none"> New collaboratives can be added to the extranet by a site administrator
Capacity to support other languages	<ul style="list-style-type: none"> All screen text on the site is in Spanish Documents uploaded to the site can be in any language 	<ul style="list-style-type: none"> Screen text can be translated to any language through a translation protocol in which an administrator define key terms in the new language
Ability to view data of multiple teams on the same chart	<ul style="list-style-type: none"> Viewers can see data only in the form in which they were uploaded The site does not have a mechanism to consolidate and display data from more than one team 	<ul style="list-style-type: none"> Indicator data entered into the database can be displayed for multiple teams on the same chart

Screen Shots from the *Mortalidad Materna* Website



Original home page of the Regional Maternal Mortality Reduction Collaborative website.

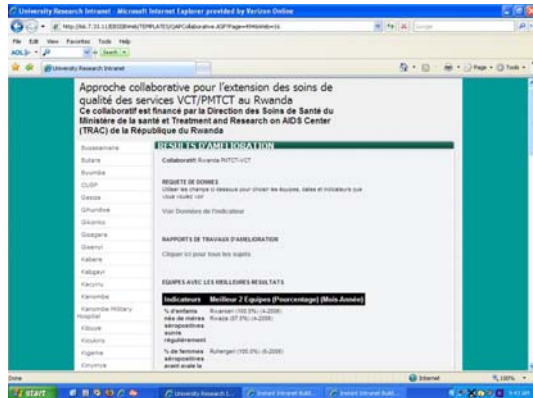
País - Unidad	Provincia / Región / Símbol	Fecha de reporte del último ciclo rutina y reporte cuatrimestre	Número de Ciclos Completados	Fecha más reciente de reporte del indicador
Ecuador - Guayas	Morona Santiago	07/08/2004	1	07/08/2004
Ecuador - Guayas	Chimborazo	07/22/2004	1	07/05/2004
Ecuador - Guayas	Chimborazo	06/09/2004	1	06/09/2004
Ecuador - Tungurahua	Tungurahua	06/09/2004	5	06/09/2004
NICARAGUA - Matagalpa	Matagalpa	06/12/2004	1	06/12/2004
NICARAGUA - Sanarate	Granada	06/12/2004	1	10/12/2004

Display of links to results and improvement reports for teams working to improve the management of obstetrical complications in the Regional Maternal Mortality Reduction Collaborative.

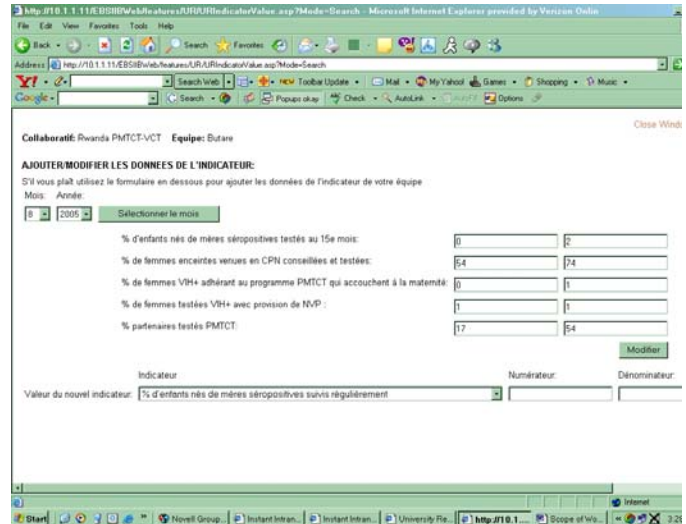


Data organized by country/province/district on the *Mortalidad Materna* website.

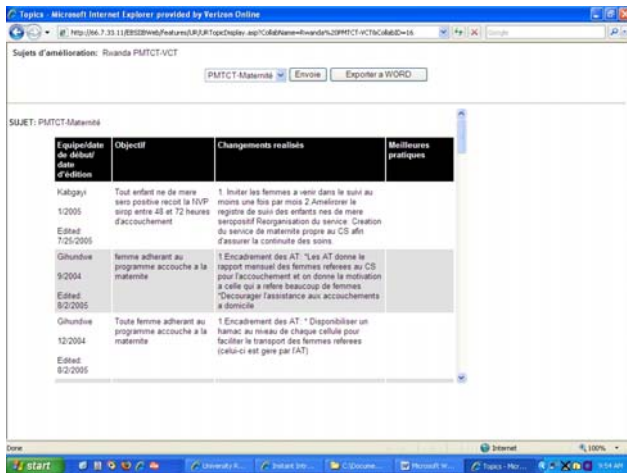
Screen Shots from the QAP Collaboratives Extranet



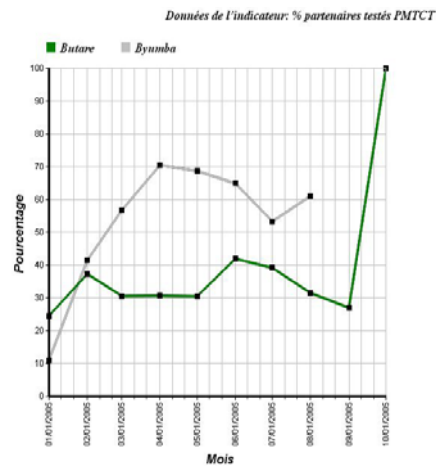
Home page within the QAP Collaboratives Extranet for the Rwanda Improvement Collaborative addressing Prevention of Mother-to-Child Transmission of HIV and Voluntary Counseling and Testing (PMTCT/VCT)



Entry screen for indicator data for the Butare team on the QAP Collaboratives Extranet pages for the Rwanda PMTCT Collaborative.



Display of improvement reports related to improving delivery care from teams in the Rwanda PMTCT Collaborative.



Display of results for the indicator “Percentage of partners tested for HIV” for the Byumba and Butare teams in the Rwanda PMTCT Collaborative.

Results

	Maternidad Materna Website	QAP Collaboratives Extranet
Time required to develop	Initial design of website: 3 months Field testing and modifications: 3 months	Initial customization of intranet software: 7 months Field testing and modifications to software: 12 months
Cost	Website design and maintenance (2 years): \$4800 Website redesign: \$2800 Total: \$7600	Basic intranet software: \$15,226 Customization: \$ 22,350 Total: \$37,576
Training	Training in website use was provided at a meeting of teams from the three countries in May 2004; a QAP staff member from the Ecuador office also travelled to each country to train local QAP staff in the use of the website's data uploading feature.	A QAP headquarters staff member visited Rwanda in July 2005 to orient QAP's Rwanda staff and facility-based teams in how to use the QAP Extranet.

	Maternidad Materna Website	QAP Collaboratives Extranet
Utilization by teams	In 2004–06, the website received more than 11,000 visits, and by the end of 2006, about 90 teams each in Ecuador and Honduras and about 40 in Nicaragua regularly (every one to three months) reported data on the website. In January 2007, hackers corrupted the site. Because the website design firm dissolved, QAP contracted with a new Ecuadorian firm to design a new site with better safeguards against hackers.	The Extranet was first used to support one collaborative in Rwanda beginning in mid-2005 through early 2006. During approximately eight months, 15 of the 16 teams entered data on the extranet pages or were assisted by QAP staff in Rwanda to do so Data entry was discontinued in June 2006 due the closure of the QAP country program in Rwanda.

Future Directions

QAP-supported collaboratives in other countries have been slow to pursue the Extranet as a mechanism for data entry and sharing. In June 2006, pages in Spanish were created on the Extranet for a QAP-supported collaborative involving regional hospitals in Nicaragua. Since then, data for a few sites have been entered by QAP staff, but the Extranet has not been introduced to facility-based teams participating in the collaborative. Ministry of Health authorities are interested in the use of the Extranet for posting and viewing collaborative data.

Conclusions

- Both of QAP's web-based platforms proved feasible and affordable to support quality improvement efforts of teams in developing countries.
- A trade-off is necessary between the speed and cost of developing a web-based solution and the product's robustness. While the *Mortalidad Materna* website was cheaper and faster to launch, it was also vulnerable to hackers. The QAP Extranet took longer to develop and at a higher cost, but it can also support multiple collaboratives in different languages.
- Collaborative managers and authorities at regional and national levels found the web-based tools particularly valuable for readily accessing results of the facility-based teams. Motivating facility-based teams, even those with Internet access, to post and view data and improvement ideas on the websites remains a challenge.

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