Research Letter: Advancing Public Health Surveillance in Child Care Centers with Stakeholder-Informed Redesign and User Satisfaction Evaluation of the MCRISP Network

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Table of Contents

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Abstract

The Michigan Child Care Related Infection Surveillance Program (MCRISP), launched in 2013, has played a crucial role in tracking illness within regional child care centers in Washtenaw County to support public health initiatives. Despite its utility, MCRISP encountered difficulties in effectively presenting data on illness trends to child care directors, who are pivotal in the collection of essential public health data. To address these challenges, we conducted a comprehensive, user-feedback driven redesign of the MCRISP system, emphasizing enhanced data accessibility and functional expansion. This abstract details the redesign process and offers insights for similar initiatives. We evaluated the redesign's impact through a standardized questionnaire administered six months post-implementation.. Feedback from 18 child care providers familiar with both the original and updated systems revealed no significant change in user satisfaction, suggesting that the improvements did not negatively affect the program's usability for end users. The updated MCRISP website now includes advanced disease tracking capabilities and the ability to rapidly develop dashboards for emerging infections, such as COVID-19, enhancing both backend efficiencies and user experience in disease monitoring. This letter details the technologies used and lessons learned in this process to help others who wish to build similar systems.

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Advancing Public Health Surveillance in Child Care Centers with Stakeholder-Informed Redesign and User Satisfaction Evaluation of the MCRISP Network

Introduction

Child care centers are important hubs for monitoring respiratory and gastrointestinal illness transmission [1, 2]. Michigan Child Care Related Infection Surveillance Program (MCRISP) is a free website that empowers ~25 regional child care center providers (CCP) to submit regional illness reports and leverages data to provide public health illness surveillance locally [3]. MCRISP has demonstrated its functionality for sentinel reporting for outbreaks [4, 5]. We gathered CCP insights on how to enhance MCRISP [6]. CCP called for improvement in multi-directional data flow, enhanced data visualization, and fortified data security measures. We provide insights into our user-feedback-driven redesign approach that emphasizes multi-directional data access to serve as a resource to those seeking to create similar surveillance systems.

Methods

Design Philosophy

Our approach was guided by a commitment to user-centered design based on stakeholder feedback [6]. We created an interface that was equipped to meet the distinct needs of our various user groups (Figure 1A). For CCP, this meant a redesigned web portal that featured a navigation toolbar, prominent display of notifications, and interactive data charts (Figure 1B). Public health officials were provided with a different user interface, one that enabled analyses of disease trends and access to illness-specific dashboards, including COVID-19 (Figure 1C). Network administrators gained enhanced control over MCRISP, including the ability to manage alerts, customize emails, curate educational content, oversee data security, and use data visualization tools. To gauge success of the redesigned MCRISP, an anonymous online survey was sent six months after its launch. Targeting both former and current registered MCRISP users, the aim was to assess whether the new features met user expectations and to compare their experiences with the previous version of MCRISP. Of the 66 individuals contacted, 24 responded, and the feedback collected from 18 of these respondents highlighted how well the updated system had been received. Data were exported and analyzed in SPSS v28 (IBM) for analysis. Statistical significance was set at $\alpha < 0.05$ level. McNemar's test was used for non-normal, paired survey data analysis to compare user experiences (new vs. old MCRISP users).

Results

Of the 66 past and present CCP registered MCRISP users, 24 (36%) responded. We evaluated responses based on completeness and included 18 of 24 responses for further analysis. Of these, 18 respondents (95%) had experience using the revamped website and 14 (74%) had experience using the old website, with 13 (68%) using both iterations. Among respondents familiar with the new MCRISP (n=18), we queried CCP usage patterns and experience with its features. Notably, 100% of these users submitted illness reports at least weekly, with 61% submitting illness reports multiple times per week. Over 83% of respondents indicated they somewhat or strongly agreed that automated weekly email summaries were helpful. Regarding engagement with educational documents and video content, 67% (N = 12/18) and 39% (7/18) of respondents used them at least once monthly, respectively, with 50% of respondents sharing resources with parents and 78% of CCPs (N = 14/18) saying they viewed illness graphics at least monthly. Among respondents using

both old and new MCRISP versions (N = 13/18; 72%), no statistically significant differences were found in their perceptions of various user experience elements, suggesting that introducing new MCRISP features did not result in a decline in users' perceived experience and no measured aspect of website perception received a lower score in the new versus old version (Figure 2).

Discussion

MCRISP is a novel approach to surveillance with its distinctive feature of real-time, multidirectional flow of data. Our approach sets MCRISP apart not only from other US-based surveillance systems but also from international counterparts such as the KIzSS network in the Netherlands [7]. MCRISP is heavily reliant on CCP as essential partners in maintaining the network's surveillance capabilities and therefore introducing enhancements carries the risk of causing disengagement among users who may find the new technology too difficult to use or does not fit into a user's workflow [8, 9]. Our stakeholder-informed approach led to improvement in system capabilities and maintenance of user engagement. For those seeking to replicate a comparable public health-centered child care surveillance system, we recommend using focus groups, followed by an iterative design philosophy to ensure stakeholders remain motivated to contribute data.

Limitations

MCRISP currently operates within one county and does not include smaller or home-based child care facilities, which may limit its generalizability.

Conclusions

MCRISP represents a paradigm shift in community disease surveillance by leveraging the child care system. MCRISP can serve as a guide for developing a stakeholder-focused approach for public health surveillance initiatives.

Acknowledgements

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Conflicts of Interest

None declared.

Abbreviations

CCP: Child Care Center Providers
COVID-19: Coronavirus disease of 2019
KIzSS: (Dutch acronym) National multi-center, day care-based sentinel surveillance network for infectious diseases
MCRISP: Michigan child care related infection surveillance program

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Figure 1:

B) Homepage of a child care provider account. The homepage of a general child care provider account displays a customized visualization showing the top primary concerns reported, key categorized disease numbers, a weekly summary of primary concerns that shows the previous five weeks, and a pie chart distribution of the week's top five reported symptoms.Data presented are for illustrative purposes only.

C) Example of COVID-19 dashboard and includes a 12-month weekly case count (top left), a pie chart, and a numerical element that showed total number of cases reported, number of facilities reporting cases, and number of cases reported by facility (bottom left), and a geographical heatmap of cases (right).

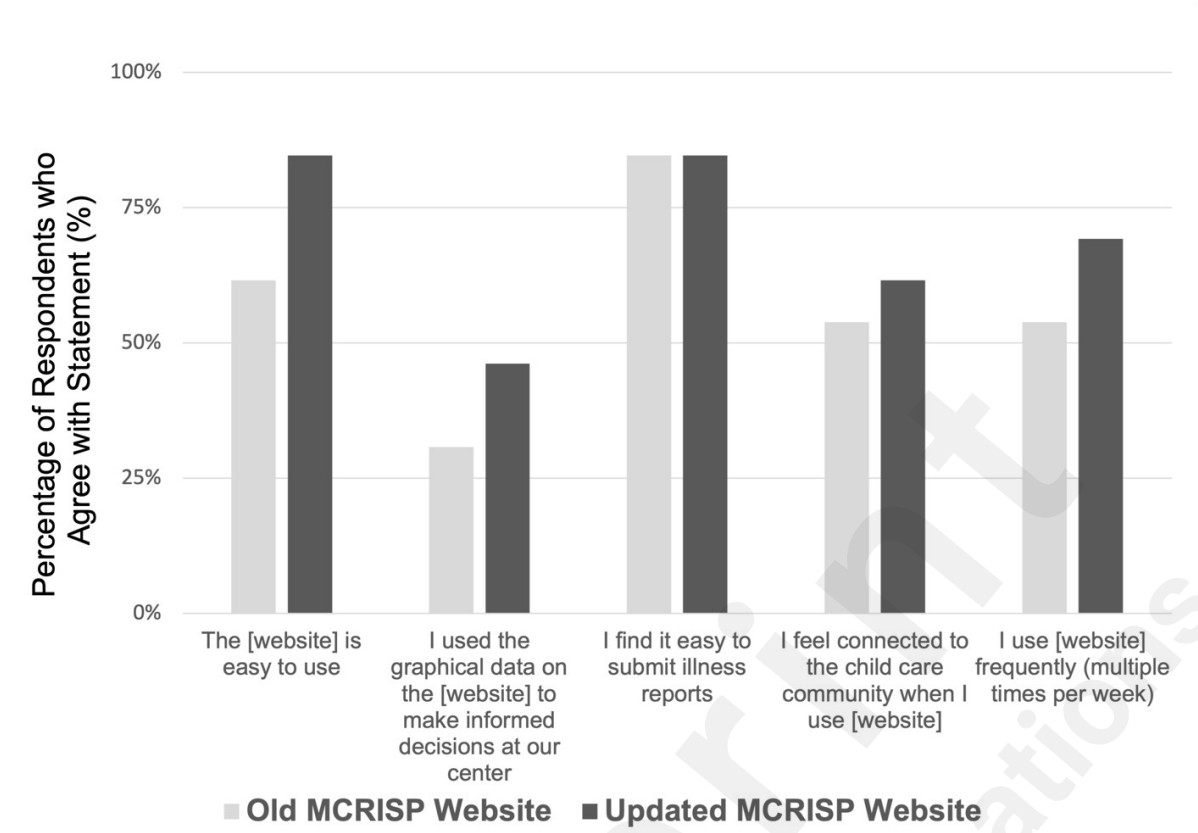

Figure 2. There was no significant difference between individual respondents with experience using both versions of the website (N=13) reported agreement with queried aspects of the user experience. Respondents answered the following question on a 5-point scale: “Please indicate your level of agreement with the following aspects of the current version of MCRISP (MCRISP.org) [ ]” where the brackets were replaced with the questions on the x-axis. If a respondent answered “somewhat agree” or “strongly agree” then their answers were counted towards the percentage that agreed with the statement. Answers of “strongly disagree”, “somewhat disagree”, or “neither agree nor disagree” were not counted towards the percentage of respondents who agree with the statement. All differences were found to be non-significant by McNemar’s Test $X^2(1) < 3.84$, $p > 0.05$.

Supplementary Files

Multimedia Appendixes

Questionnaire provided to child care providers.
URL: http://asset.jmir.pub/assets/55f2700ccc5d9e6b185b6792444c9eff.docx