

2019 NPCR MINNESOTA SUCCESS STORY

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A picture is worth a thousand minutes

NATIONAL PROGRAM OF CANCER REGISTRIES SUCCESS STORY

SUMMARY: Business intelligence tools can increase efficiency in cancer registry operations. These tools have a flexible, interactive user-interface and data visualization capacity that can facilitate routine data analyses for decision making. The analyses are easily stratified (filtered), enabling users to simulate a variety of solutions for consideration. This success story describes how MCRS has used the data visualization capacity in Tableau to reduce the time needed to process and analyze data required to adjust workloads, and to identify and correct errors in geocoded data. A description of how Tableau will be used to monitor reporting from facilities is also provided.

CHALLENGE: Cancer is a biological disease not a statistical one. But statistics are necessary to measure the burden of cancer and inform cancer prevention and control programs and policy. State cancer registries systematically collect the data needed to estimate cancer statistics at the national, state and local levels. Collecting, coding, and processing data is guided by numerous standards to ensure the data collected are comparable across different geographic areas and time periods. Each year standard setters add to or change definitions of required database elements to keep up with scientific advances in cancer biology and medicine. The evolving definition of cancer and the increasing number of data elements needed to meaningfully describe cancer contribute to the challenges cancer registries face to assure the quality and timeliness of cancer data. Additional challenge is posed by a shortage of qualified, trained tumor registrars. To comply with changing standards and increasing volume of data processed, registry staff need to work smarter and more efficiently. Software solutions based on artificial intelligence promise to maximize the efficiency of registry operations. Technology using natural language processing exists to automate the process of identifying reportable cases, but solutions to automate case consolidation and coding are only in the development and testing phase. Thus, completing case consolidation and coding are largely time-consuming manual tasks. However, business intelligence tools are available now that can increase efficiency of other tasks in registry operations.

SOLUTION: Business intelligence tools such as Power BI and Tableau among others, can increase the efficiency in registries. These tools allow users to quickly process large amounts of data and present results in easily understood dashboards with tables, charts, and graphs. The user-interface enables users to interactively explore relationships, patterns, and trends. These features – rapid, interactive data processing and easy to understand results – can decrease the time needed to complete a variety of tasks, including identifying errors/edits in data, running analyses of registry data to inform priorities and decision making about operations, and conducting data audits to assess compliance with established standards.

RESULTS: In Minnesota, registry staff have used the interactive data visualization capacity in Tableau to (1) make decisions about the volume of manual consolidation tasks assigned to each staff person and (2) identify and correct errors in geocodes while analyzing data in response to community concerns about cancer. Assessing the volume of consolidation tasks per staff person enables registry management to adjust workloads quickly to meet pressing deadlines. Accurate longitude and latitude geocoded values are essential for completing valid, timely analyses of perceived excess cancers in

a community. Additionally, MCRS staff are developing solutions in Tableau to routinely monitor the timeliness of data reporting. This will enable staff to identify delays in reporting cancers from facilities or health systems. The following table summarizes the (potential) efficiency MCRS gained using Tableau to carry out these three tasks.

Task	Without data visualization	Increased efficiency with data visualization using Tableau
Distributing the number of manual consolidation tasks equally among field staff	<ul style="list-style-type: none"> Data Analysis: Run reports to use SQL to extract files and output data to Excel. In Excel, enumerate the number of consolidation tasks per staff and facility and summarize results. Reassign staff to facilities, rerun report to extract data and import into Excel. Then enumerate work load based on reassignment. Duration: Minimum of 3 uninterrupted 8-hour work days to run reports, analyze data, summarize and make decisions. 	<ul style="list-style-type: none"> Data Analysis: Connect to the database and queries to enumerate consolidation tasks for each field staff by facility. Display results in a bar chart and analyze data. Simulate solutions by reassigning facilities to staff and analyzing workload to find the best distribution of manual consolidation tasks. Duration: A maximum of one 8-hour day to develop the analysis. A maximum of 30 minutes to analyze results, run simulations, and make decisions. Efficiencies: Faster data analyses; easy to understand results; can develop optimal work plans using simulation
Identify and correct errors in geocodes for analyses of cancer in communities	<ul style="list-style-type: none"> Data analysis: Extract file of cancer data. Import extract and shape files into ArcMap. Use layers as needed to identify addresses that fall outside of a defined geographic area on a map. Compile a list of records with errors and request corrections, if resolution is not immediately possible. 	<ul style="list-style-type: none"> Data analysis: Connect to live database, map longitude and latitude to identify addresses outside of defined geographic area. Export records with errors and request corrections if resolution is not immediately possible. Efficiencies: Connection to database and filtering capacity allows for instant data mapping and analysis.
Developing the capacity to monitor timeliness of reporting from facilities to identify delays or gaps	<ul style="list-style-type: none"> Data analysis: Run SQL queries to assess time from diagnosis to the date loaded into system for each cancer, stratified by facility. Use SAS to develop a table of results showing the distribution of cancers reported by time period (days since diagnosis) to identify reporting delays or gaps by facility and/or cancer. 	<ul style="list-style-type: none"> Data analysis: Connect to database and run SQL queries to assess time from diagnosis to date loaded into system, filter by facility, primary site, reporting year. Graphically display results to identify reporting delays or gaps. Potential efficiencies: Visual display of results is more readily understood; interactive analysis; easily to filter results by facility, primary site, or time period interactive capacity

SUSTAINING SUCCESS: The steps to sustaining success are straightforward. Routinely using data visualization tools in cancer registries requires a commitment to change, resources for software licenses and training, and brainstorming about how/when data visualization could add efficiencies to routine operations. Some long-time staff may be reluctant or unwilling to give up familiar, manual tasks and this may pose as a barrier. Registries can carry out best practices for change management to facilitate the adoption of new practices and procedures. Finally, program evaluation can be conducted to measure the impact of change on registry operations.

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