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Outcome Measures for State Flex Program Financial and Operational Improvement Interventions

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KEY FINDINGS

- Education and collaborative learning are important foundational activities in State Flex Program (SFP) Critical Access Hospital (CAH) financial and operational improvement (FOI) strategies, but it is difficult to directly link them to improvement in CAH financial and operational performance.
- CAH learning collaboratives provide a unified, structured framework to coordinate SFP FOI activities across the Flex Program funding cycle.
- SFPs traditionally focus primarily on output and long-term outcome measures for FOI activities and less on short- and intermediate-term outcome measures.
- Efforts to document Flex Program impact would benefit from less emphasis on outputs and greater emphasis on outcome measures, particularly short- and intermediate-term (interim) outcome measures to provide a bridge from project activities to long-term outcomes.
- SFP consultants and vendors can support outcome measurement by identifying short-, intermediate-, and long-term outcome measures in their reports, as well as baseline data; actionable outcome targets; and a realistic timeline to reach performance targets.

INTRODUCTION

This is the second brief on strategies to monitor Critical Access Hospital (CAH) financial and operational improvement (FOI) interventions implemented by State Flex Programs (SFPs). It supplements our March 2021 policy brief, Monitoring State Flex Program Financial and Operational Improvement Activities. This brief describes outcome measures for select FOI initiatives implemented under Program Area 2.

The FY15-18 Funding Opportunity Announcement[1] for the Medicare Rural Hospital Flexibility (Flex) Program required SFPs to conduct annual statewide financial and operational needs assessments of their CAHs (Activity Area 2.01) to inform interventions in one or more of the following areas:

- 2.02 - In-depth assessments of at-risk CAHs and action plans to address their FOI vulnerabilities
- 2.03 - Revenue cycle management to improve billings, collections, and profitability
- 2.04 - Initiatives to improve the efficiency and operational performance of CAHs

For the FY19-23 funding cycle, Program Area 2 was reorganized to create a fifth activity category for value-based payment projects but retained the same basic framework and activities.[2-3] As a result, the findings and measures in this brief remain relevant to SFP initiatives in the FY19-23 funding cycle.

This brief describes strategies to monitor the impact of select FOI interventions such as educational and collaborative learning activities, in-depth assessments and action planning, revenue cycle management, chargemaster reviews, and Lean process improvement projects. It reviews the underlying theories of change for these activities and identifies short- and intermediate-term (interim) outcomes to assist SFPs in monitoring their FOI work.

METHODS

The study team identified FOI initiatives using the FY15-FY18 applications, work plans, and progress reports for the 45 SFPs and summarized categories of initiatives within the three activity areas. Fourteen SFPs (Idaho, Illinois, Indiana, Massachusetts, Michigan, Montana, Nevada, New York, North Carolina, Pennsylvania, South Carolina, South Dakota, Texas, and Washington) were selected for further study based on the interventions proposed, geographic distribution of states by census region, number of CAHs in the state, and use of consultants versus SFP staff. Telephone interviews with SFP staff were conducted in June and July 2019 using semi-structured interview protocols. Assessment reports, plans, tools, and other work products resulting from FOI interventions were requested from study participants. The study team analyzed interview transcripts and related documents to identify key themes.

PERFORMANCE MEASUREMENT FOR EDUCATIONAL AND COLLABORATIVE LEARNING ACTIVITIES

SFPs commonly implemented educational and collaborative learning initiatives as foundational activities to support their FOI work. FOI educational programming included face-to-face meetings, webinars/video calls, presentations by subject matter experts, peer learning opportunities, dissemination of best

FIGURE 1: Potential Output Measures for Educational Activities

Theory of Change: FOI educational programming (e.g., face-to-face meetings, webinars/video calls, presentations by subject matter experts, peer and collaborative learning networks, and dissemination of best practices) are designed to provide context and background information to support FOI programming and to support the sharing of knowledge between CAHs. As these are supporting a ctivities for Flex Programs, it is difficult to directly connect these activities to specific outcome measures. As such, the following are recommended output and process measures that can be used by SFPs to monitor and manage these activities but are less relevant for outcome measurement.

- The number of meetings, educational programs, and events held
- The number and diversity of program topics covered
- The number of CAHs and the number of their staff participating in meetings and events
- The number of CAHs sharing best practices and the number of best practices shared
- The percentage of CAHs that report satisfaction with the meeting, webinar, program, etc.
- Percentage of CAHs that report significant changes in knowledge and skills resulting from participation in SFP educational meetings and programs
- Percentage of CAHs that report having implemented changes in their policies and/or operations following participation in the educational meetings and programs

practices, and collaborative learning networks. To monitor the impact of these activities, SFPs commonly used a series of output and process measures which measured participation in educational activities.

To advance their measurement strategies for educational activities, many SFPs used pre/post-event surveys to assess participants' changes in knowledge and their plans to implement organizational and/or strategy changes based on their participation. Although these surveys represent a more substantive effort to collect data on the impact of SFP educational efforts, it is also important to assess the extent to which CAHs are moving from changes in knowledge to changes in action. SFPs would benefit from expanding these surveys to collect information on the organizational and/or strategy changes implemented by participating CAHs, and on the resulting financial and operational improvements. This would require repeat surveys of participating CAHs at appropriate time intervals. Although participation and implementation metrics provide important data to manage project activities, they do not directly measure the impact of participation on CAH financial and operational performance.

Among our 14 study states, eight states (Idaho, Indiana, Massachusetts, Michigan, New York, North Carolina, Texas, and Washington) implemented collaborative learning initiatives to engage cohorts of CAHs in shared learning. SFPs used output and process measures that mirrored those used for educational initiatives in that they focused on CAH participation in the different activities undertaken by the learning collaboratives.

Our 2021 brief on the use of cohorts in quality improvement initiatives reinforced the importance of tracking the application of new knowledge and the implementation of shared interventions by cohort participants.[4] Effective collaborative learning groups exhibit the following characteristics and practices:

- Target an important need among a group of CAHs
- Develop interventions with an evidence-based chain of outcomes
- Define clear expectations for participation and reporting
- Identify common metrics, establish baseline data, and set facility-specific targets
- Engage participants in specific performance improvement initiatives
- Monitor program implementation
- Measure impact at different stages of the program

SFPs would benefit from the application of a similar strategy under Program Area 2 by working with cohort members to implement a consistent set of interventions, measures, and quality assurance practices across the funding life cycle. For example, the impact of this work can be monitored by tracking the level of participant engagement; changes in CAH operations, strategies, or policies; and improvements in financial and operational performance over time through meeting records, periodic surveys of participants, and the collection of performance data using common metrics.

As with educational activities, it is difficult to link FOI improvement directly to the organization and characteristics of a collaborative learning initiative. This is due, in large part, to the fact that the development of a collaborative learning initiative provides a foundation and structure for implementing FOI initiatives. As such, the outcome measures should be determined by the specific initiative being implemented. It is, however, still useful to monitor key output and process measures to manage and support the collaborative learning initiative (Figure 2).

OUTCOME MEASUREMENT FOR FINANCIAL AND OPERATIONAL IMPROVEMENT INITIATIVES

As we move to examine outcome measurement for FOI interventions, we note that it is difficult to identify a defined set of outcome measures for SFP FOI activities. One of the primary reasons for this is that

FIGURE 2: Potential Output Measures for Collaborative Learning Initiatives

Theory of Change: Collaborative learning initiatives provide a foundation for the implementation of specific FOI initiatives to encourage shared learning, identification and sharing of best practices, the implementation of a common intervention, and the identification and reporting of common metrics at different stages of the program.

- Percentage of CAHs that participate consistently in programs and activities of the collaborative
- Percentage of CAHs that report satisfaction with their participation in the learning collaborative
- Number of CAHs and the number of their staff participating at each meeting and/or event
- Percentage of CAHs sharing best practices and the number of best practices shared
- Percentage of participating CAHs that have implemented the identified intervention
- Percentage of participating CAHs that consistently report data on project implementation and impact throughout the project lifecycle

SFPs propose and implement a diverse set of FOI initiatives based on the needs of their CAHs. In comparison to Program Area 1: CAH Quality Improvement, Program Area 2 does not define a mandatory set of activities and measures such as those provided by the Medicare Beneficiary Quality Improvement Project which serves as an organizing structure for Flex Program quality improvement activities.[3] Additional challenges to measuring the impact of FOI initiatives include:

- The timeline for initiatives to reverse long-term financial vulnerabilities (e.g., improving market share or implementing new service lines) may exceed the length of the funding cycle.
- External factors (e.g., economic conditions, demographic shifts, or third-party payment policies) may blunt the impact of FOI initiatives.
- Initiatives such as revenue cycle management or chargemaster reviews may contribute to improved performance but may be insufficient on their own to reverse a vulnerable CAH's underlying financial challenges (e.g., low patient volume or poor market share).

As a result, it is critical that SFPs develop clear theories of change that describe how initiatives will contribute to their long-term goals and identify interim outcome measures that provide a chain of evidence to document movement towards those long-term goals.[5] To support SFPs in doing so, we will focus on specific FOI initiatives and provide appropriate interim outcome measures for each.

In-Depth Assessment and Action Planning

In-depth assessments are intended to evaluate the challenges faced by vulnerable CAHs and support the development of action plans to address their vulnerabilities. In measuring the impact of this work, SFPs typically focused on output measures to document the development and delivery of assessment reports and action plans. Additionally, SFPs tended to focus mainly on high-level outcome measures such as improved Medicare margins or enhanced financial stability. A primary explanation for why many SFPs focus on long-term measures for this assessment and action planning work is that it is difficult to identify appropriate interim measures until such time as the in-depth assessment is completed and appropriate interventions are identified. Once the intervention strategies are identified, SFPs are better positioned to identify necessary interim outcome measures. The interim outcome measures should be reported in

subsequent non-competitive continuation (NCC) applications and end-of-year reports. Examples of output and long-term outcome measures identified by SFPs are discussed in Figure 3. Interim outcome measures for specific FOI interventions are covered in the following sections.

Revenue Cycle Management (RCM)

RCM focuses on the administrative and clinical functions that enable CAHs to be paid appropriately for their services, beginning when a patient makes an appointment for services and ending when all claims and patient payments have been collected. Failure to manage these functions can result in reduced cash flow, delayed payments, and reduced operating margins as well as subject a CAH to unnecessary write-offs and denials, recoupment requests, audits by third-party payers, and challenges to its tax-exempt status for failure to comply with Internal Revenue Service financial accountability guidelines. Figure 4 describes the theory of change for RCM activities and interim outcome measures that may be used to monitor the impact of SFP RCM initiatives. SFPs may choose from this list based on the issues identified through assessments of a CAH's revenue cycle.

Sample revenue cycle assessment reports received from SFPs identified various issues that delayed or reduced CAH reimbursement and recommended strategies to address identified issues. These assessments were less likely to identify measures to monitor the impact of these recommendations or to propose improvement targets. As part of their assessment work, contractors/consultants conducting RCM assessments should be

FIGURE 3: Potential Output and Outcome Measures for In-Depth Assessment and Action Planning

Theory of Change: Vulnerable CAHs are targeted for in-depth assessments. These assessments evaluate the challenges faced by vulnerable CAHs, identify priority areas for improvement, and support the development of action plans to address their vulnerabilities. Action plans should provide strategies to address the identified priority areas for improvement.

Common Output/Process Measures	Examples of Long-term Outcome Measures Proposed by State Flex Programs

• Number (#) and percent (%) of CAHs receiving in-depth assessments
• # and % of CAHs completing the action planning process
• # of assessment reports and action plans competed
• # and % of CAHs implementing strategies identified through the assessment and action planning process
• # of strategies implemented by CAHs receiving assessment and action planning support
	• Participants achieve:
	  • Total margins of 2.61%
	  • Operating margins of 1.13%
	  • Medicare inpatient mixes of 75.39% and outpatient payer mixes of 37.59%
	  • Debt service coverage ratios of 2.52
	• 80% of participating CAHs make measurable and meaningful progress
	• 100% of CAHs improve the % of patients in the correct level of care from admission
	• 100% of CAHs have improved days cash on hand
	• 7 of 11 low cohort CAHs move to a higher cohort

asked to identify baseline data and benchmarks for relevant RCM metrics and suggest targets for interim outcome measures.

Chargemaster Reviews

A chargemaster is the foundation of a CAH's revenue cycle that provides a list of all the billable services and items essential to the billing process.[9] The chargemaster details the costs of each procedure, service, supply, prescription drug, and diagnostic test provided by the hospital and the fees associated with services. As services are provided, hospitals undertake a process called charge capture to ensure that all services provided to a patient are reflected in claims submitted to insurance carriers and patients. Upon delivery of a service, hospital providers document the encounter in the medical record and coding staff assign codes for claim submission. Claims for third-party payers (and bills for patients) are generated for each code based on the chargemaster rates. An inaccurate chargemaster can result in overpayment or underpayment, claim rejections, undercharging for services, failure to capture charges for legitimate services, compliance violations, and recoupment requests from third-party payers. Chargemaster pricing decisions are also important due to the implementation of CMS price transparency regulations and the impact of pricing on the ability of hospitals to compete within their markets.

As with RCM activities, the potential impact of chargemaster reviews on CAH FOI performance depends on issues identified during the review. If some charges are below the rates paid by third-party payers, legitimate charges are being missed, or services are being under-coded, a chargemaster review may lead to changes that result in additional revenues. If a chargemaster review reveals that a hospital is over-coding for a service or charging separately for a service or item that is part of a bundled rate, the result of corrections may be a reduction in billed revenues.

Interim outcome measures may be selected from those used for RCM initiatives based on the results of the chargemaster reviews. Depending on the findings, it may be necessary to further divide these measures by service line. Figure 5 describes the theory of change and additional interim measures that may be used to monitor the impact of chargemaster reviews.

We received chargemaster reports from two SFPs. Although we cannot generalize our observations from these reports to all chargemaster reviews, they provide insights into how chargemaster reviews could be extended to monitor progress. In one report, the vendor produced a priority classification for recommendations ranging from high priority with significant financial and/or compliance impact to low priority with relatively limited financial impact. The vendor also provided an estimate of the financial impact of the recommended changes. The second report provided a summary of recommended changes to codes, line-item descriptions, and the addition or deletion of codes along with a review of the hospital's pricing methodology but did not provide an estimate of the financial impact. Neither report provided interim outcomes or targets to monitor the impact of chargemaster changes.

Given the expense of chargemaster reviews and the potential impact on hospital revenues, we believe it would be worthwhile for SFPs to request that contractors include interim outcome measures and targets in their final reports, and that participating CAHs report which recommendations were adopted along with the interim outcome measures at established points in time. This would allow SFPs to accurately monitor the impact of chargemaster reviews and determine whether or not the grant funding was well spent. This would also allow SFPs to identify the actual interventions and/or changes implemented (rather than just the completion and delivery of the final report) as well as measures to track progress.

Service Line Assessments

Service line assessments identify the contribution that each service line makes to a hospital's financial sustainability and position in the community. The results allow hospital leaders to understand how each service line affects the overall hospital; how each service line compares to others; and how each service line might

FIGURE 4: Potential Interim Outcome Measures for Revenue Cycle Management*

Theory of Change: Revenue Cycle Management seeks to improve the administrative functions associated with claims processing and payment to ensure prompt and appropriate payment for services rendered. These functions include patient scheduling and registration, point of service financial counseling and collection, pre-service insurance verification and authorization, utilization review, management of charge schedules, charge capture and coding, claims submissions, follow-up with third party payers, processing payments and rejections, payment postings, appeals, and collections.[6]

- ***Net collection percentage***- total receipts/[total patient charges- (contractual adjustments + bad debt + uncompensated care)] x 100
- ***Net patient revenue per patient encounter***- total patient revenue/office encounters
- ***Net patient revenue as a percent of total patient revenue***- total patient revenue- (contractual allowances + bad debt + uncompensated care)/total patient revenue
- ***Bad debt expense as a percent of total patient revenues*** - bad debt/gross patient revenue
- ***Charity/free care as a percent of total patient revenues***- charity & free care/gross patient revenue
- ***Unreimbursed costs of means-tested government programs as a percent of total patient revenues***- uncompensated costs of means-tested government programs/total patient revenues
- ***Total uncompensated care as a percent of total patient revenues***- total uncompensated care/total patient revenue
- ***Days in accounts receivable (AR)***- total AR/average daily charges
- ***Percent of AR over 60, 90, and 120 days***- subtotal AR within each age category/total AR
- ***Point of service patient collections as a percent of net revenue***- point of service patient collections/net patient revenue
- ***Percent of claims denied***- number of claims denied/aggregate number of claims submitted
- ***Percent of denied claims re-billed***- number of denied claims that were successfully re-billed/total denied claims
- ***Clean claims rate***- percent of claims paid on the first pass/number of claims submitted
- ***Cost to collect patient revenue***- collections for patient care services/collection costs (e.g., salaries, benefits, service agreements, subscription fees, transaction fees, overhead costs)
- ***Percent of accounts discharged not final billed (DNFB)***- (ratio of accounts held for billing due to coding or documentation gaps) (number of accounts DNFB/all discharged accounts)
- ***Registration errors as a percent of total registrations***- total number of registration errors/total registrations

**Sources for these measures include the Health Care Financial Management Association and the National Rural Health Resource Center.[7-8]*

FIGURE 5: Potential Interim Outcome Measures for Chargemaster Reviews

Theory of Change: Chargemaster reviews provide an opportunity to identify and correct errors and omissions in a CAH's chargemaster to provide a solid foundation for its revenue cycle.

- ***Gross price per discharge*** - gross inpatient revenues/total admissions
- ***Gross price per visit***- gross outpatient revenues/outpatient visits
- ***Gross revenue per adjusted admission***- total patient care revenue/adjusted admissions
- ***Net revenue per adjusted admission*** - total patient revenue – total deductions/adjusted admissions

be improved. Poor performing service lines may be modified or discontinued to reduce revenue losses or expenses. New service lines may be undertaken to improve a hospital's competitive position in the marketplace, better meet local needs, and generate new revenues. Given the longer time horizon needed to realize the impact of service line changes, short- and intermediate-term measures should focus on service line utilization metrics, contribution margins, efficiency measures, and changes in hospital costs (Figure 6).

Market Share and Outmigration Analyses

Market share and outmigration analyses are closely related to service line assessments. These issues are critical to the financial viability of CAHs given the low utilization of services at many CAHs and the high number of patients that bypass local services (up to 76 percent of patients in some rural counties).[11] Market share analyses focus on the share of the local market captured by a CAH.[12] Outmigration analyses focus on the extent to which residents leave the community to obtain care that is otherwise available in the community.[13] Patients leaving the community to obtain services that are available locally represent a significant lost revenue opportunity.

Reversing lost market share and patient outmigration are significant undertakings involving service line improvement, changing perceptions of the quality and desirability of local care, addressing issues with hospital image, and, potentially, system upgrades and building renovations. The impact of such changes typically requires a longer time horizon to be fully realized. This is another activity in which interim outcome measures are needed to capture data on incremental changes that lead to eventual improvements in market share and reductions in outmigration. The choice of measures should be driven by the findings of the assessments and the recommended corrective actions. Market share and outmigration patterns are often calculated using claims data which can be costly and complex to use. It may thus be more practical to monitor the impact of market share or outmigration improvement efforts using changes in utilization, service activity, or patient satisfaction (Figure 7).

Lean and Six Sigma Process Improvement

The last area of FOI activity we reviewed was the use of Lean or Six Sigma tools to improve the efficiency and operational performance of CAHs. These activities were often described under Activity Area 2.04, but this was not always the case. The challenge in monitoring the impact of this work is similar to other areas of SFP FOI activity. In the case of Lean and Six Sigma, however, the emphasis on output and process measures is consistent with the focus of these tools on process improvement. Still, it is necessary to supplement process measures with appropriate outcome measures to determine if process improvements were effective in improving performance.

FIGURE 6: Potential Interim Outcome Measures for Service Line Assessment

Theory of Change: Service line assessments are a process to evaluate which service lines are essential to a hospital's long-term success, which should be de-emphasized or discontinued, which can be improved, and which may be added to a hospital's portfolio based on market demand and/or the needs of their communities.[10]

- ***Average daily census*** *(by service line)*
- ***Outpatient utilization*** *(by service line)*
- ***Market share*** *(by service line)*
- ***Contribution margin*** *(by service line)* - revenue from services minus all variable expenses; difference between per unit of revenue and per unit cost (variable cost rate) and represents the amount that each unit of output contributes to cover the fixed costs
- ***Acute care discharges*** *(by service line)*
- ***Outpatient gross revenue as percent of gross patient revenue***- (gross outpatient revenue/gross patient revenue) X 100
- ***Service line revenue per adjusted discharge***- gross patient revenue by service line/adjusted discharges

FIGURE 7: Potential Interim Outcome Measures for Market Share and Outmigration Analyses

Theory of Change: Market share and patient outmigration are influenced by perceptions of the availability and acceptability of services. Ideally, these analyses should quantify market share or outmigration patterns; determine where residents are going for care, what services they obtain outside of the community, and why they are seeking care elsewhere; and analyze the factors contributing to market share or outmigration issues. This information can inform strategies to improve market share or reverse outmigration.

- ***Inpatient market share*** - discharges/total county discharges
- ***Inpatient market share*** *(by service line)*- discharges by service line/total county discharges by service line
- ***Increase in utiliation*** *(by service line)* - inpatient, outpatient, swing bed, primary care, etc.
- ***Increase in utilization by individuals living in the CAH's community compared to local population growth*** *(by zip code)*
- ***Increase in utilization by targeted age group***
- ***Improvement in patient satisfaction*** *(based on HCAHPS or other efforts to assess community perception of a CAH and its quality of care)*
- ***Changes in average daily census (or patient volume)*** *(by service line)*

As the process improvement activities implemented by SFPs typically allow CAHs to tailor projects to their own needs, it is difficult to identify a set of outcome measures that would apply to all SFP Lean and Six Sigma activities. The summary of Lean projects implemented by nine CAHs in Indiana exemplifies the diversity of projects undertaken by participants.[15] Among the nine CAHs, three sought to improve emergency department operations and efficiency; three focused on improving billing accuracy, reducing days in accounts receivable, and reducing claims denials; two focused on improving the process to prep imaging patients; one streamlined its urgent care center patient intake process; and one implemented a change management process for chargemaster updates. Given this complexity, SFPs should select measures based on the focus of the projects implemented as well as measures that monitor staffing and cost efficiency (Figure 8).

DISCUSSION

Our evaluation of FOI outcome measurement demonstrates the challenge of monitoring and documenting the impact of SFP initiatives. As noted earlier, education is a foundational activity to enhance CAH financial and operational performance by improving the knowledge base of CAH administrators and staff. Although FOI-related education is an important Flex Program activity, it is difficult to "prove" educational activities are directly linked to improvements at the CAH level. Some SFPs conduct pre-/post-education surveys to assess participant satisfaction with the educational programs and self-reported changes in knowledge. It is less common for SFPs to collect data on how participants are utilizing their new knowledge to drive changes in financial and operational performance. To link FOI education to CAH performance improvement, it is necessary to collect data on changes in hospital policies, procedures, or systems following participation in educational programming as well as outcome data using metrics appropriate to the implemented interventions.

Collaborative learning initiatives, which include peer learning efforts, provide a unified process to engage CAH administrators and staff in shared learning, implementation of evidence-based joint interventions to address common needs, and mandatory collection and reporting of outcome measures to document financial and operational performance. Collaborative learning interventions provide a structured framework to coordinate SFP FOI activities across the funding cycle, support the achievement of shared goals, efficiently use Flex resources, and collect and report evidence to document program impact. As such, SFPs should be strongly encouraged to adopt a collaborative learning strategy under Program Area 2: Financial and Operational Improvement.

As many interventions depend on the results of in-depth assessments and action plans, it is not surprising that SFPs focus on high-level outcomes in their competitive applications. Until such assessments and action plans are completed, it is difficult to know exactly what the needs of vulnerable CAHs are, what strategies will be helpful to them, what their own priorities are, and what interim outcome measures are needed to monitor program impact during the funding cycle. As action plans are completed and interventions are implemented, SFPs become better positioned to identify interim outcome measures relevant to their portfolio of FOI activities.

Those conducting the assessment and action planning process (e.g., consultants, SFP partners, or SFP staff) can support efforts to document program impact by identifying short-, intermediate-, and long-term outcome measures for the recommendations provided in their action plans; baseline data for these measures; actionable target goals; and a realistic timeline to reach performance targets. Requests for proposals for assessment and planning work should include these elements as project deliverables. At the same time, CAHs receiving assessments should be asked to report on the specific recommendations they have implemented as well as outcome data at appropriate time intervals. Finally, SFPs should be asked to report interim outcome measures as they are identified during the assessment and planning process, and outcome data reported by CAHs as part of their subsequent NCC applications and end-of-year reports.

FIGURE 8: Potential Interim Outcome Measures for Lean and Six Sigma Process Improvement

Theory of Change: Lean process improvement in healthcare uses "Lean" ideas to minimize waste in processes, procedures, and tasks through an ongoing system of improvement.[14] Six Sigma focuses on reducing variations in the delivery of care by minimizing medical errors and removing defects from processes involved in delivering care.[14] Both approaches seek to optimize operations and increase value to patients and third-party payers.

- ***Full-time equivalent (FTE) personnel per adjusted average daily census*** - number of FTE personnel/adjusted average daily census
- ***FTE personnel per 100 adjusted discharges***- (number of FTE personnel/adjusted discharges) x 100
- ***Salary and benefits expense per FTE personnel***- (total salary expense + employee benefits expense)/number of FTE personnel
- ***Salary and benefits expense as a percentage of operating expense*** - [(total salary expense + employee benefits expense)/total operating expense] X 100
- ***Overhead expense as a percentage of operating expense*** - (total overhead expense /total operating expense) × 100
- ***Worked hours per patient day***- (inpatient, swing bed, long-term care beds, central supplies/purchasing, administration, patient financial services, billing and coding, medical records, community relations, compliance and quality improvement, information systems, etc.)
- ***Worked hours per emergency department visit***
- ***Worked hours per procedure***- (surgery, anesthesia, radiology, CT, ultrasound, etc.)
- ***Worked hours per visit***- (Rural Health Clinics, outpatient, specialty changes)
- ***Worked hours per billed test***- (laboratory)
- ***Worked hours per meal served*** - (dietary)
- ***Worked hours per square footage*** - (housekeeping, plant)

Our review of the applications for FOI activities reinforced our longstanding observation that output measures are over-emphasized in many SFP applications and workplans. We further observed that output and outcome measures are often confused in many SFP applications, particularly as they relate to training and educational programming. As noted earlier, SFPs most commonly use measures of participation to monitor their educational and collaborative learning initiatives.

As education and collaborative learning are activities that support, but do not directly drive, CAH FOI outcomes, we suggest that SFPs reduce their emphasis on output measures in their plans to monitor and document the impact of FOI activities. Instead, more emphasis should be placed on choosing outcomes measures specific to the FOI interventions implemented such as revenue cycle management, billing and coding programs, chargemaster reviews, market share analyses, outmigration studies, or

Lean process improvement as discussed in this brief.

This is not to say that output and process measures are not important. They should be used by SFPs to monitor program implementation and management activities. However, an early emphasis on outputs often obscures a clear focus on outcome measures.[16]

Examples of tools that could be used as templates to support Flex Program outcome measurement and data collection include North Carolina's quarterly contractor progress reporting tool and the Rural Hospital Performance Improvement Project's Pre-/Post-Project Outcomes Work Sheet.[17] The Flex Monitoring Team's logic modeling toolkit also provides important resources and tools to support outcome measurement and project management.[5]

CONCLUSIONS

Given the complex FOI needs of CAHs and the high number of CAHs at financial risk, efforts to improve their financial and operational stability remain an important aspect of Flex Program activities. The evaluation of the outcomes and impact of SFP FOI activities can help to better target the use of scarce SFP resources and support the long-term continuation of Flex Program funding. As SFP FOI activities vary greatly across the 45 participating states and their CAHs, the ability to document the impact of FOI initiatives grows in importance. Close evaluation of the outcomes and impact of SFP FOI activities can help to better target the use of scarce SFP resources and support the continuation of Flex Program funding. This brief provides recommendations on potential interim outcome measures for SFP FOI initiatives as well as the timing of the selection of outcome measures.

REFERENCES

1. Federal Office of Rural Health Policy. *Medicare Rural Hospital Flexibility Grant Program. Funding Opportunity Announcement.* U.S. Department of Health and Human Services, Health Resources and Services Administration; February 3, 2015. HRSA-15-038. Accessed September 15, 2021. https://www.ruralcenter.org/sites/default/files/HRSA-15-038%20Final.pdf
2. Federal Office of Rural Health Policy. M*edicare Rural Hospital Flexibility Program. Notice of Funding Opportunity FY 2019.* U.S. Department of Health and Human Services, Health Resources and Services Administration;2019. HRSA-19-024. Accessed September 15, 2021. https://grants.hrsa.gov/2010/Web2External/Interface/Common/EHBDisplayAttachment.aspx?dm_rtc=16&dm_attid=e215d1f4-efe3-4bec-8d29-05b24290b235
3. Federal Office of Rural Health Policy. *Medicare Rural Hospital Flexibility Program Structure for FY 2019 - FY 2023. Version 1.0.* U.S. Department of Health and Human Services, Health Resources and Services Administration; December 4. 2018. Accessed September 15, 2021. https://www.ruralcenter.org/sites/default/files/Flex%20Program%20Structure%20for%20FY%2019%20-%20FY%2023%20v1.0.pdf
4. Gale J, Jewell C, Kahn-Troster S, First N. *Evaluation of the use of critical access hospital [CAH] cohorts for quality improvement activities.* University of Southern Maine, Flex Monitoring Team;2021 March. Policy Brief #58. Accessed September 7, 2021. https://www.flexmonitoring.org/sites/flexmonitoring.umn.edu/files/media/fmt-pb58-cohorts_2021.pdf
5. Gale J, Coburn AF, Loux S. *Creating program logic models: A toolkit for state flex programs.* 2006. Accessed September 27, 2021. https://digitalcommons.usm.maine.edu/healthpolicy/20/
6. Berger, S. *Fundamentals of Health Care Financial Management: A Practical Guide to Fiscal Issues and Activities*, 4th Edition, Chapter 5. John Wiley & Sons, Incorporated, 2014.
7. Healthcare Financial Management Association. *MAP Keys: MAP Keys are industry-standard metrics or KPIs used to track your organization's revenue cycle performance using objective, consistent calculations.* 2021. Accessed September 27, 2021. https://www.hfma.org/tools/map-initiative/map-keys.html.
8. National Rural Health Resource Center. *Delta Region Community Health Systems Development Program: Best Practice Concepts in Revenue Cycle Management Guide.* October 2019. https://www.ruralcenter.org/sites/default/files/Best%20Practice%20Concepts%20in%20Revenue%20Cycle%20Management%20Guide%20FINAL%20508%20Version.pdf.
9. LaPointe, J. *The role of the hospital chargemaster in revenue cycle management. Revenue cycle intelligence.*

2018, February 9. Accessed September 1, 2021. https://revcycleintelligence.com/features/the-role-of-the-hospital-chargemaster-in-revenue-cycle-management.

10. Modern Healthcare Insights. *Hospital service line organization: Innovation in approaches and strategy.* 2012. Accessed September 15, 2021. https://www.modernhealthcare.com/assets/pdf/CH81353810.PDF.
11. Mosely, D. 2020 *Rural Hospital Sustainability Index: Trends in Rural Hospital Financial Viability, Community Essentiality, and Patient Outmigration.* 2020, April 8. Accessed September 15, 2021. https://guidehouse.com/insights/healthcare/2020/rural-hospital-sustainability-index.
12. Frazier, A. *How to systematically kick start growth* Blog post. 2020. Updated January 20. Accessed September 27, 2021. https://blog.stratasan.com/topic/healthcare-market-share
13. Dunn S. *Patient outmigration: Keys to explore.* Blog post. 2017. Updated July 20. Accessed September 27, 2021. http://blog.intalere.com/2017/07/patient-outmigration-keys-explore/
14. New England Journal of Medicine Catalyst. What is lean healthcare? *NEJM Catalyst*. 2018. Updated April 27. Accessed September 27, 2021. https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0193
15. Purdue Healthcare Advisors. *Building a lean network: Lean healthcare transformation initiative for Indiana critical access hospitals and rural hospitals.* PHA; 2018. Accessed September 27, 2021. https://pha.purdue.edu/programs/lean-healthcare-transformation-initiative/
16. Knestis K. *Kicking outputs out of logic models.* Blog post. 2017. Updated January 30. Accessed September 21, 2021. https://aea365.org/blog/kicking-outputs-out-of-logic-models-by-kirk-knestis/
17. National Rural Health Resource Center, *Rural Hospital Performance Improvement Project.* Pre-/post-project outcomes worksheet. National Rural Health Resource Center;2014. Accessed September 27, 2021. https://www.ruralcenter.org/sites/default/files/program-evaluation-workshop/Transition%20Outcomes%20Work%20Sheet.docx

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