Resources to Support System and Logic Testing for Unwinding when the PHE Ends

September 2022

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Introduction and Context

This document provides resources for states as they create and execute test plans in preparation for the end of the COVID-19 Public Health Emergency (PHE) & unwinding.

States may have had several changes in systems and processes since the start of the PHE. Comprehensive testing could ensure a smoother transition post-PHE and support continuity of coverage for beneficiaries.

> Note: Enhanced federal matching funds are available subject to approval to support comprehensive testing activities.[1]

This guide aims to support states in planning for and prioritizing testing efforts specific to unwinding, such as determining high-risk areas and system vulnerabilities, and identifying unwinding-related testing scenarios.

Note: This document is not intended to serve as a comprehensive reference on creating testing plans; rather, it aims to provide resources to help states tailoring their testing plans to the changes from unwinding

[1] https://www.medicaid.gov/federal-policy-guidance/downloads/SMD16004.pdf
Note: Throughout the document, 'states' refers to U.S. states, territories, and a federal district

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This Resource Guide consists of the three following sections:

- **Resources for testing unwinding changes/issues:** Overview and deep dives on test planning (e.g., test scenarios, governance), test process and tools setup (e.g., data validation, schedule, test environment), and test execution and follow-up (e.g., reporting)
- **Automated testing:** Opportunities, best practices, and examples of automated testing
- **Testing resources from CMS:** Sample testing guidance and tools

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Note: These considerations are not comprehensive and may not apply to all states, since processes and policies will differ state by state

Test planning

- ☐ 1 **Identify unwinding system and process changes to test**
- ☐ 2 **Select testing scenarios** and supporting data for those scenarios
- ☐ 3 Identify stakeholders to engage for testing and **refine the operations and governance model** to make key decisions
- ☐ 4 **Determine test type(s)** (e.g., user acceptance testing, regression) **to best test system/process changes**

Test process and tools setup

Test criteria and mitigation plan

- ☐ 5 **Assess criteria for accuracy, timeliness, and completeness**
- ☐ 6 **Define go/no go conditions and mitigation path**

Testing schedule

- ☐ 7 **Consider sequencing, owners, timing, scenarios, reporting for each test phase**

Testing environment

- ☐ 8 **Adjust business requirements and system processes to create/update environment**
- ☐ 9 **Address multiple testing environments** (e.g., testing between E&E and MMIS)
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1 Identify unwinding system and process changes to test

Types of changes	Issues	Sample changes/issues to test *(not exhaustive)*
Testing for unwinding-related changes	Policy changes	• Test system for **changes made in prioritization approach** for restarting renewals and changes in **eligibility logic** (e.g., waivers, demonstrations, postpartum eligibility changes)
	Operational Changes	• Test to ensure any **workarounds to pause redeterminations have been removed** • Test any **new communication channels and touchpoints** with beneficiaries and their tech/data integration with systems • Test for accurate and efficient reporting from E&E to modules outside the system following **changes to data reporting requirements**
Testing for unwinding-related risks	Volume of Applications	• Test system ability to handle **spike in applications and data processing** for beneficiaries (e.g., data interfaces, back-end database/service and application bandwidth)
	External Integration	• Test **usability** of system for state employees (e.g., UAT testing for eligibility workforce, navigators, call center operators), especially if there were large workforce changes throughout PHE and confirm security rules are correctly set up
Testing to confirm that end-to-end system for completing redetermina-tions is functioning as needed	Internal Functionality	• Test all **data, tech and users underlying redetermination process** (e.g., Are eligibility determinations valid? Are auto-matic transfers going through? Are manual processes being conducted correctly? Are security certificates up to date?) • Address system **vulnerabilities and bottlenecks** known to the state prior to PHE (e.g., past errors and workarounds) • Test system **modernization, changes, enhancements, and new technology** since the start of PHE (e.g., migrating to cloud, integrated system, additional automated processes)
	External Integration	• Test system's ability to successfully **integrate external data** (e.g., data for eligibility verification from SSA, IRS, DMV, state agencies providing SNAP data) • Test other **external tech integrations and dependencies** (e.g., state integrations with other Health and Human Services departments)

In order to **identify potential additional unwinding changes to test,** states could

- Review their system documentation, change request history, grant proposals and/or budgets to find documented changes
- Consider new federal policies, state programs, and guidelines introduced since the start of PHE
- Validate changes to ensure they were implemented

Watch out for cascading changes built on top of unwinding changes

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2 Select testing scenarios

States should assess how system changes made during the PHE impact complex beneficiary scenarios and should be considered during testing

Potential unwinding beneficiary scenario types[1]

Age	Applicant who aged out of Medicaid during the PHE (e.g., applicants aged 65+, young adults who have aged out of CHIP)
Household	Multiple addresses; No address; Changes to household tax filing status; Mixed household with individuals eligible for different categories; Move across state lines; Changes to marital status
Income	Household members with income discrepancies using verified data or whose income cannot be verified; Income changes (e.g., due to loss of wages, seasonal); No income; Switch between MAGI and non-MAGI eligibility
Pregnancy status	Applicants whose postpartum period has ended but have MAGI eligibility; outdated pregnancy status in a beneficiary's account
Other demographic factors	Applicants who have aged out of former foster care coverage; Full-time students who changed residency; Individuals with changes in immigration status or expired documents; Incarcerated household members (e.g., pending and not pending disposition of charges); Death data
Other coverage / eligibility	Enrollment in alternate coverage (e.g., Medicare, Medicaid, CHIP, Marketplace, private)

Can look to PERM audits as they relate to eligibility in order to create additional scenarios specific to states

1. Testing that involves testing within the Federal Data Services Hub environment might have additional test data considerations

Potential mitigation tactics

- **Boundary testing**: Testing validity of extreme ends and boundary values (e.g., income, dates, ages, file size, data-field entry thresholds) to detect anomalies at partition fringes
- **Negative testing**: Ensures that the system can handle invalid input or unexpected user behavior to detect and mitigate potential system errors
- **Hackathon testing**: Focused testing where an array of stakeholders (e.g., programmers, designers, case workers) try to identify potential edge-cases or bugs in the system to facilitate collaborative evaluation
- Ensure built-in flexibility in the reenrollment process to mitigate potential risks with edge-cases (e.g., retroactive eligibility, open feedback channels, testing manual overrides)

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3 Refine the operations and governance model

Testing team capacity and training

- Plan for capacity for testing, including capacity for remediation, and for state staff working with testing vendors (e.g., systems integration vendors, Independent Verification & Validation vendors)
- Testing teams may have had staff turnover during PHE; use a learning management system to refresh/conduct training and track completion
- Different systems may have different testing teams, which could create challenges with coordination and end-to-end system testing; align early on context, operations, and importance of specific processes with all teams, and have a complete and shared view of system architecture
- Designate a change management team to provide clear communication to testing staff, vendors, and agency stakeholders on expectations, timing, and how to handle defects, eligibility criteria, etc.
- Review existing processes for hybrid/remote work (e.g., communication, coordination, how to use tools virtually, testing resources available)

Decision making on testing plans and outcomes

- Provide clarity and single point of responsibility around key roles and decision-making (e.g., go/no go criteria) so there is alignment on interpreting how results impact each state's implementation decisions (e.g., defect management)
- Involve both business and technical decision makers and experts (e.g., policy and system leads) in managing testing process and prioritizing key decisions
- Large decision-making committees could slow down testing; breakdown, limit and clarify decision-making roles and thresholds
- Ensure an appropriate testing organizational structure and test manager to own testing list, support and communicate prioritization, and manage testing schedule

External stakeholder coordination

- Coordinate with external partners (e.g., FFM) to effectively and accurately test interactions between systems
- Create clear communications channel between agencies/departments, especially for integrated systems (e.g., coordination with Office of Information Technology, system changes via change advisory board reviews) to report any planned technical changes in other systems (i.e., reporting meeting with broader state technical staff)
- Engage with CMS (e.g., State Officers) to resolve issues throughout the testing process

4 Determine test type(s) to best test system/process changes

Considerations by testing type

Test Type	When to use to test unwinding changes	Considerations
Unit Testing Used to test that a specific piece of functionality works as expected without dependencies	• Testing changes to ensure that unwinding system changes and processes made to pause redeterminations have been removed • Testing removal of temporary PHE eligibility changes (e.g., waivers, demonstrations tied to the end of PHE)	• Ensure accurate and thorough coverage of valid values/inputs to reflect the differences between before, during, and post PHE • Consider downstream effects of eligibility changes (e.g., reporting, financial components, claims system) to unit test individual changes
System Integration Testing Used to verify that all integrated systems maintain data integrity and subcomponents operate in coordination successfully to provide expected results	• Testing all data, tech and users underlying the end-to-end steps of redetermination, focusing on changes since the PHE • Test system's ability to successfully integrate external data (e.g., data for eligibility verification from SSA, IRS, DMV, state agencies providing SNAP data) • Test connections within system modules (e.g., financial management, eligibility, enrollment, reporting, claims warehouse, MMIS) to ensure they are all working together	• Understand performance of each connection between modules and potential bottleneck for renewal-dependent integrations • Ensure the test environment is following anticipated business processes as closely as possible (e.g., ensure clarity for rule-based eligibility) • Ensure integration testing includes manual processes and testing with eligibility workforce/case workers • For integrated HHS system, check for dependencies and integrations with other services as well as impact on other services/Medicaid
Regression Testing Used to ensure an application still functions as expected after any code changes, updates, or improvements	• Testing changes made in prioritization approach/eligibility logic • Testing changes to ensure workarounds to pause redeterminations have been removed • Test system modernization, changes, enhancements, and new technology since the start of PHE (e.g., migrating to cloud, integrated system, additional automated processes)	• Consider the downstream effects of the changes states made during the PHE • Consider impact on manual processes and eligibility workforce • Build efficient tests that pressure test the most critical features first • Check if standard regression deck/scenarios should be updated with PHE-specific examples

Further details on test types can be found in the SMC Medicaid Enterprise Systems (MES) Testing Guidance Framework

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4 Determine test type(s) to best test system/process changes (cont.)

Considerations by testing type

Test Type	When to use to test unwinding changes	Considerations
Performance/Load Testing Used to determine stability and responsiveness of an application under certain workloads (e.g., to check scalability, reliability and resource usage)	• Test system ability to handle spike in applications and data processing for beneficiaries (e.g., data interfaces, back-end website and application bandwidth) • Test connections between state systems (e.g., MMIS, E&E, data warehouse) at production volumes	• Accurately estimate full volume of data needed to process per day, week, month (e.g., based on system capacity, staff constraints, performance metrics, transaction loads, system utilization changes in renewal volumes) • Test capability of eligibility workforce and case workers to handle manual steps for increased volume of beneficiaries • Especially important for state systems with real-time eligibility capabilities
User Acceptance Testing Used to verify the system can support day-to-day business and user scenarios to validate rules, flows, data and overall fit for use and ensure system is sufficient and correct	• Test usability of system (e.g., UAT testing for eligibility workforce, navigators, call center operators), especially if there have been large force changes throughout PHE	• Develop test scenarios based off likely and exception cases; consult with policy, call center, eligibility workers, State Medicaid Director, leadership team and other stakeholders to ensure scenarios mirror day-to-day business processes • Ensure training materials provide consistent guidance and expectations • Utilize role-based testing (e.g., beneficiary, case worker, case manager)

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Considerations by testing type

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Data Testing Data migration, validation, and integration testing to ensure data connections/linkages are functioning	• Testing data interfaces for changes since the PHE (e.g., new versions, data fields may have changed) • Testing data migration from legacy to new system with minimal disruption/downtime and full data integrity (e.g., transfer to cloud) • Testing for accurate and efficient reporting from E&E to modules outside the system (e.g., T-MSIS, performance indicators, account transfers), including changes to CMS data reporting requirements	• Ensure accurate and thorough data is being collected for E&E system in order to validate eligibility rules prior to production • Understand the end-to-end data linkages and connections • Ensure testing for common challenges with data intake (e.g., accepting multiple file types, data-field complications, data-matching issues, applicants who submit multiple applications, applicants with duplicate names)
Security Testing Used to verify that sensitive information, such as PII and PHI, is protected	• Testing for data integrity (e.g., safeguards against corruption across system), authorization (e.g., ensuring safeguards are in place and certificates are up to date), and availability (e.g., scheduled downtime with backup) as services are turned back on • Validate security of new interfaces and data exchanges implemented in support of unwinding	• Review any new reports and data flows created during the PHE for potential PII, PHI, and FTI in any reporting summaries

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Unwinding systems testing considerations

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5,6 Test criteria and mitigation plan

Define risks, thresholds, and mitigations for accuracy, timeliness, and completeness of test results prior to testing

- **Entry criteria:** Determine entry criteria for each release (e.g., scenarios/test cases developed, environment ready to test, no outstanding defects from the prior test cycle)
- **Test execution:** Create checklist/report for execution including the relevant metrics to track and performance thresholds (e.g., execution %, open defects, actual test cases executed to date)
- **Exit criteria:** Determine performance thresholds (e.g., test case execution completion, % pass rate, defect management) sufficient to complete phase of testing
- **Defect management:** Develop mitigation tactics and escalation plan for when performance thresholds have not been met, including defect documentation, prioritization (e.g., based on severity, magnitude of impact of defects), timelines, owners, and retesting
- **Go/No go conditions and mitigation path:** Determine go/no go based on readiness review criteria and testing results

Source: Deidentified sample materials shared by states

Sample test criteria

Release 7.35.1 – SIT Exit Summary

SIT Entrance Criteria

	Test Team Review	Functional Team Review	State Review	Feedback Provided
SIT Coverage Package	Completed	Completed	Approved	Approved

SIT Exit Criteria

SIT Exit Approval	Metrics
SIT Overall	95%
SIT / Theme	80%
Regression	95%
TC execution	100%

Exit Criteria

- 100% SIT and Regression test case e
- 96 % SIT Script and Ticket Pass Rate
- 95% Pass Percentage for Regression
- No outstanding P1/P2 defects. (Exclu
- Any outstanding Sev 3/Sev 4 defects

Performance Exit Criteria

- All performance test has been completed as planned
- System performance has been assessed according to the goals of the testing
  - Transaction response times should be under defined target response time for specific transaction types (See below Performance threshold Section)
- Transaction response time should be comparable with previous release and baseline results (See below Performance threshold section)
  - No anomaly should be observed during the test for system resources like CPU, Memory etc.
- Performance Test report prepared and shared to relevant stakeholders
- Any outstanding Severity/ Priority 2- high defects must be reviewed and deferred by the leadership team (i.e., acceptable to begin UAT with these tickets pending resolution and retest).
  - Deferred defects must have an expected date to enter UAT and UAT schedule should be able to accommodate the deferred items. By agreement, work arounds may need to be formulated and tested for defects that won't be ready or at risk for UAT.
- Performance issues/bottlenecks identified during the testing has been analyzed, closed & retested successfully
  - Critical and high severity defects have been fixed and closed, unless agreed upon by all stakeholders
  - Remaining open defects have been documented with an expected agreed-upon resolution plan.

Performance Threshold

Below are the threshold values to trigger the analysis for the transaction response time.

S No	Transaction Response Time Range	% Variance threshold to trigger analysis	Comments
1	< 1 Second	40%	Any transaction with response time less than 1 second will be analyzed based on merit of degradation
2	1<3 Seconds	25%	
3	3<5 Seconds	10%	
4	>5 Seconds	5%	

7 Testing schedule

Considerations for creating an unwinding test schedule[1]

- **Sequencing**: What is the sequence of test phases? How do they overlap/interact with each other? Are there any dependencies?
- **Owners**: Who is the responsible party for each phase?
- **Timing**: What are the dedicated start and end dates for each cycle? How much time is dedicated to each test cycle? Is it adequate? Does it build in enough time for remediation following testing?
- **Scenarios**: How many scripts/scenarios are being run for each test? Are there enough to get accurate results?
- **Reporting**: When are stakeholders receiving results? What is going to be reported to them?

1. May be dependent on test method (e.g., agile, waterfall, development)

Source: Deidentified sample materials shared by states

Sample test schedule

Category	Activity	Status	Start Date	End Date	Count of Scripts	Owner Team	Notes/Next Steps
COVID Enhancements	System Release 21 COVID CRs	Not Started	8/1/22	9/2/22	35	Vendor COVID SIT	Writing negative test scripts as R21 go-live (Sep) will be within PHE period
	System Release 21 COVID CR's	Not Started	9/12/22	10/7/22	35	State UAT	
Eligibility determination & Unwind Enhancements	SNAP Match CR	Completed	6/1/22	6/29/22	19	Vendor COVID SIT	
	SNAP Match CR	Not Started	9/12/22	10/7/22	19	State UAT	Script review in progress
	EOE Testing (includes Positive CR testing)	In Progress	7/5/22	9/16/22	250	Vendor COVID SIT	Testing in progress
	EOE Testing/Pending Cycle Testing (Includes Positive CR testing)	Not Started	8/1/22	9/9/22	150	State Member Services	Reviewing the test scripts and plan dates/support
	EOE Testing/Pending Cycle Testing (Includes Positive CR Testing)	Not Started	9/12/22	10/7/22	160	State UAT	Reviewing the test scripts and plan dates/support
Renewal Processes	Ad Hoc Renewal	In Progress	7/5/22	TBD	TBD	State Member Services	Awaiting details from eligibility determination
On-Hold Batch Processes	Batch Testing	Not Started	8/1/22	9/9/22	40	Vendor COVID SIT	Identifying/updating the scripts
	Batch Testing	Not Started	9/12/22	TBD	40	State UAT	Prioritizing other testing efforts until September

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8-10 Testing environment

Confirm state's ability to create/update stable test environment across various environments

- Ensure state has identified business requirements and system process adjustments, e.g., ex parte, AT, etc.
- **Address multiple testing environments**
  - — Define the various testing environments and limitations
  - — Confirm process of managing testing environments
  - — Some states may need to test between E&E and MMIS systems, and some states do not have test environments for all modules
  - — Confirm modules have corresponding testing environment/lower environment
- **Determine potential environment configuration needs**
  - — Consider opportunities to automate

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11 Test tracking/reporting consistent with CMS Streamlined Modular Certification (SMC) requirements

According to the Medicaid Enterprise Systems (MES) Testing Guidance Framework of the CMS Streamlined Modular Certification:

*"**CMS expects states to share testing and quality metrics with CMS. Metrics include, but are not limited to:***

- *Percentage of **requirements covered by and traced to test cases**.*
- *Percentage of **software code covered by test cases**.*
- ***Current list of defects with data**, such as defect title, description, test case reference, requirements reference, severity, open date, status, etc.*
- *Charts or graphs showing the **distribution of defects by severity level**.*
- *Graphs showing the **rate of opening and closing defects**.*
- *Statistics showing **defect age**.*
- *Statistics for **defect reopening**."*

Source: Streamlined Modular Certification Medicaid Enterprise Systems (MES) Testing Guidance Framework

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Importance of automated testing

What are the benefits of testing automation?


1 **24/7:** Test scripts can run anywhere in the world remotely any time through cloud test grid


2 **Fewer human resources:** Fewer manual testers and manual testing processes needed


3 **Reusability:** Scripts are reusable across versions and over time


4 **Reliability:** Faster and more reliable outcomes when running repetitive tests which may cause error from manually testing


5 **Simultaneity:** Testing multiple devices simultaneously can generate detailed comparative reports to ensure compatibility


6 **Continuity:** Integrate code into a shared repository through Continuous Integration (CI) to trigger testing codes and generate testing data automatically


7 **Additional methods:** Implement methods to test applications and operational infrastructure which cannot be done manually


8 **Volume:** Run tests on thousands of Medicaid beneficiary cases when manual testing of such volumes would be infeasible

Automated testing best practices

Test organization

Automated framework structure

- Structure test hierarchy considering connections between automation plans and how automated tests might implement, require, and support other automated tests
- Share test components and behaviors to use across projects

Traceability

Detailed reporting mechanism

- Ensure detailed traceability of tests to quickly identify and communicate the root causes of test failures
- Create execution reports with success/failure steps and descriptions for relevant system configurations
- Implement snapshots for failed steps to best inform understanding of defects

Reusability

Configuration for parameterized tests

- Configure tests to account for ability to run multiple executions of the same test with different parameters
- Code system without using hard-coded data in scripts
- Invest in cross-platform capabilities so that single tests can be executed on Android/iOS/desktop web/mobile web, local/on cloud, standalone/parallel

Lessons learned from state testing automation

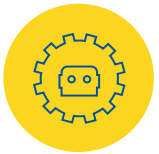
Code Stability

- Effective automated testing requires code and data fields to be stable so processes function as intended
- Frequent code changes can disrupt development of automated processes

Standardized test scenarios

- States need to be able to test the same scenarios repeatedly using standard test data in order to compare effectiveness of automated processes
- Selecting test scenarios that cover the population broadly helps states prioritize

Investigating failures



- Important for states to develop effective and efficient plan to investigate defects
- Setting up clear criteria for automation success and failure enables state prioritization of automated efforts

Automated testing example solutions

Category of automation solution	Automated solution description	Example challenge addressed
Test case management	• Standardizes test case setup for easier collaboration across organization • Keeps test cases, including test data, in repository and holds test scripts subject to version control • Maintains library of record for test plans, requirements, risks • Facilitates organization of execution plan to be scheduled based on test cases and development team code changes	• Maintaining and organizing plans for testing can be overwhelming when done manually • Communicating and delegating assignments across workstreams is complex without a standardized hub
Defect management	• Utilizes tracking tools to find and record bugs and defects in code • Includes planning features to manage issues throughout software development cycle • Supports custom workflows to efficiently and effectively resolve bugs • Deploys automated notifications configured for delegating tasks to individuals	• Tracking manually (e.g., excel) can be tedious and time-consuming • Efficiently managing and assigning workers to bug resolution is difficult without a streamlined effort
Stress and performance testing	• Simulates performance of servers or networks under heavy load • Measures, reports, and analyzes various KPIs related to system strength • Generates data on speed, responsiveness, capacity, and reliability of software • Informs potential improvements for targeting bottlenecks, reducing downtime risk, and enhancing scalability	• Heightened loads during unwinding will test capacities and may crash systems • Lack of understanding of system capacity can lead to underutilization of systems and suboptimal redetermination processing speed

Note: Automated solutions might not apply to all states, since processes and policies will differ state by state

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Automated testing example solutions (cont.)

Category of automation solution	Automated solution description	Example challenge addressed
Regression testing	• Automates performance of regression and functional testing for web-based and desktop applications and environments	• Code changes may result in unintended side-effects or breakages in application • Manual testing for applications can be infeasible for exhaustive test cases
Accessibility testing	• Reveals potential problems in HTML/JSP code that may make it difficult for visually impaired users to use a screen reading tool and to navigate pages successfully • Supports screen reader accessibility testing allowing blind and visually impaired users to read the screen either with a text-to-speech output or by a Refreshable Braille display	• Ensuring accessibility of systems and ADA compliance
Continuous Integration (CI) automation	• Allows developers to frequently integrate their code changes, triggering an automated code build and test sequence • Automates chain of actions to support building, testing, and deploying software	• Bulk testing at the end of a build instead of testing and fixing code changes as developers update code results in more time-consuming, complicated, and inefficient testing
Security testing	• Finds and flags security-sensitive code to detect and prevent issues	• Compliance and security vulnerabilities (e.g., data leaks)

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Overview of CMS testing resources

Guidance Type	Resource title	Description	Source
CMS Unwinding	Medicaid Enterprise Systems (MES) Testing Guidance Framework	Lists a set of CMS expectations and recommendations for testing (e.g., on test planning, test execution, and operational monitoring)	https://www.medicaid.gov/medicaid/data-and-systems/downloads/mes-testing-guidance-framework.pdf
CMS Unwinding	Top 10 Fundamental Actions to Prepare for Unwinding and Resources to Support State Efforts	Lists a set of unwinding preparation actions and resources (e.g., actions on testing, renewal distribution planning, automation)	https://www.medicaid.gov/resources-for-states/downloads/top-10-fundamental-actions-to-prepare-for-unwinding-and-resources-to-support-state-efforts.pdf
General Testing	18F De-risking Guide	Provides guidance for delivering successful custom technology projects in government, including a sample quality assessment surveillance plan	https://derisking-guide.18f.gov/
General Testing	Medicaid and CHIP Frequently Asked Questions (FAQs)	Contains frequently asked questions regarding Federal Financial Participation and IT system development	https://www.medicaid.gov/federal-policy-guidance/downloads/faq061319.pdf
General Testing	CMS State Testing Team	Coordination and tracking of all testing for all states consuming bulk and synchronous services offered by the Federal Data Services Hub (FDSH)	state.testing@cms.hhs.gov

Overview of CMS testing resources (cont.)

Guidance Type	Resource title	Description	Source
T-MSIS	Transformed Medicaid Statistical Information System T-MSIS	Discusses T-MSIS data quality progress across states for outcomes-based assessment	https://www.medicaid.gov/medicaid/data-systems/macbis/transformed-medicaid-statistical-information-system-t-msis/index.html
T-MSIS	CMS Guidance: Overview of Data Quality T-MSIS Priority Items	Explains T-MSIS priority items for high quality, accurate, and complete data reporting	https://www.hhs.gov/guidance/document/cms-guidance-overview-data-quality-t-msis-priority-items
T-MSIS	Update on Transformed Medicaid Statistical Information System (T-MSIS)	Discusses quality of state-level data, use of T-MSIS, data improvements, and continuing challenges	https://www.macpac.gov/wp-content/uploads/2021/04/Update-on-Transformed-Medicaid-Statistical-Information-System-T-MSIS.pdf
SMC	Streamlined Modular Certification	Discusses introduction of SMC and IT Investment Lifecycle and directs states to resources for certification	https://www.medicaid.gov/medicaid/data-systems/certification/streamlined-modular-certification/index.html
SMC	Updated Medicaid Information Technology Systems Guidance: Streamlined Modular Certification for Medicaid Enterprise Systems	Provides updated Medicaid IT project guidance and discusses requirements for states as CMS streamlines certification approach	https://www.medicaid.gov/federal-policy-guidance/downloads/smd22001.pdf
SMC	Streamlined Modular Certification for Medicaid Enterprise Systems Certification Guidance	Provides specificity around SMC (e.g., includes outcomes, basic indicators of project health, metrics, and operational reports)	https://www.medicaid.gov/medicaid/data-and-systems/downloads/smc-certification-guidance.pdf
SMC	CMS Certification Repository	Contains a central hub for information on MES certification process for states, CMS, and vendors to engage with and share	https://cmsgov.github.io/CMCS-DSG-DSS-Certification/


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