

Automating Health Care Data Validations

Lessons from Colorado's All Payer Claims Database (CO APCD) APM, DR, and VBPC Programs

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Background

All payer claims database (APCD) programs depend on accurate, non-claims-based submissions to support transparency and policy decisions, directly affecting the reliability of insights used to guide health care spending, regulation and system performance. Annual files such as Alternative Payment Models (APM), Drug Rebate (DR), and Value-Based Pharmaceutical Contracting (VBPC) contain complex datasets submitted by payers, often including three to four years of historical data.

Each submission requires extensive validation across multiple dimensions, including comparisons to prior submissions, APCD data, and year-over-year reporting. Historically, this validation process has been manual, time-intensive, and difficult to scale, creating significant burden for analysts and increasing the risk of inconsistencies.

Objective

To design and implement an automated validation framework that:

- ✓ Reduces manual effort and processing time
- ✓ Improves accuracy and consistency of validation outputs
- ✓ Standardizes validation logic and reporting language
- ✓ Enables scalable, repeatable validation across payers, file types, and reporting years

Operational Improvements

Before the addition of automation, the validation process for the Annual Files was time-extensive, complex and highly repetitive. Implementation of a Python-based automation solution drove substantial operational improvements:



50% Time Reduction

Validation time cut from 200+ to ~90 hours annually



Scales to 20+ Payers

Handles multiple versions + diverse file types



Standardized Validation

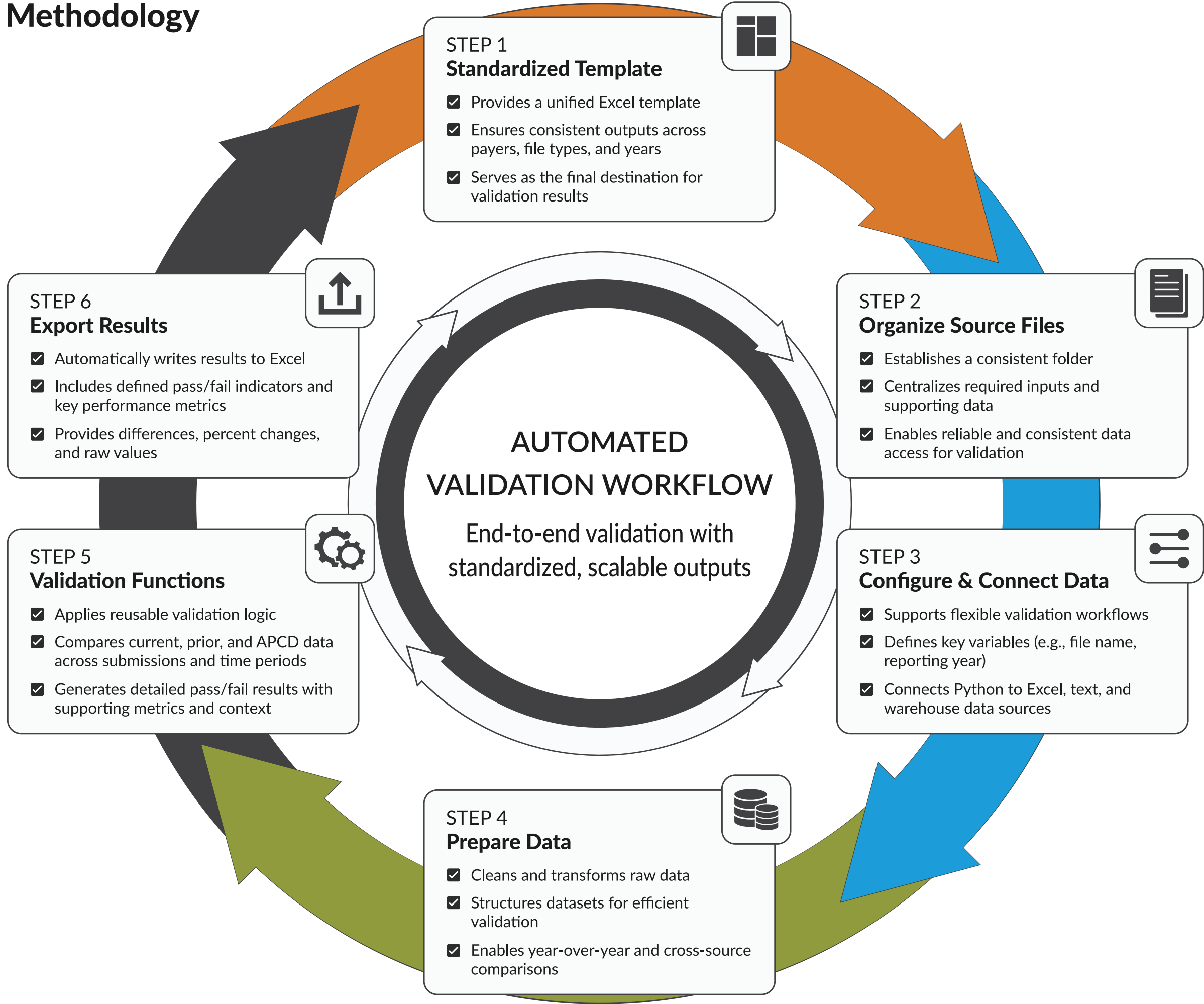
Consistent logic replaces manual variability



Automated Reporting

Excel outputs with pass/fail + detailed metrics

Methodology



**STEP 1
Standardized Template**

- ✓ Provides a unified Excel template
- ✓ Ensures consistent outputs across payers, file types, and years
- ✓ Serves as the final destination for validation results

**STEP 2
Organize Source Files**

- ✓ Establishes a consistent folder
- ✓ Centralizes required inputs and supporting data
- ✓ Enables reliable and consistent data access for validation

**STEP 3
Configure & Connect Data**

- ✓ Supports flexible validation workflows
- ✓ Defines key variables (e.g., file name, reporting year)
- ✓ Connects Python to Excel, text, and warehouse data sources

**STEP 4
Prepare Data**

- ✓ Cleans and transforms raw data
- ✓ Structures datasets for efficient validation
- ✓ Enables year-over-year and cross-source comparisons

**STEP 5
Validation Functions**

- ✓ Applies reusable validation logic
- ✓ Compares current, prior, and APCD data across submissions and time periods
- ✓ Generates detailed pass/fail results with supporting metrics and context

**STEP 6
Export Results**

- ✓ Automatically writes results to Excel
- ✓ Includes defined pass/fail indicators and key performance metrics
- ✓ Provides differences, percent changes, and raw values

Impact

Implementation of a Python-based automation process significantly improved efficiency and data quality.

- Improved Data Quality**
Automation reduced manual entry and review errors, resulting in more consistent, reliable submissions.
- More Actionable Outputs**
Enhanced validation logic produced clear, detailed and structured validation results, enabling faster identification of data issues and more efficient resolution by submitters.
- Increased Analyst Efficiency**
Automation reduced repetitive, manual tasks, allowing analysts to focus more time on higher-value activities such as more in-depth analysis and insight generation.

Conclusion

Automating the validation of non-claims-based health care data submissions substantially improves efficiency, accuracy, and scalability. Replacing manual SQL-driven workflows with a flexible Python-based framework reduced analyst burden, minimized errors, and produced more consistent and actionable outputs.

Beyond supporting current validation needs, this approach creates a scalable foundation for future enhancements, including more advanced analytics, expanded validation logic, and continuous improvement in health care data quality.

Although implementation details may vary across APCDs and organizations, this framework demonstrates that validation automation can be successfully adapted to different reporting environments and provides a practical model that others can build from.

Additional Information

For more detailed information on how to create your own Python-based automation, please scan the QR code below. For questions: info@civhc.org



Scan to view the automation workflow presentation

Learn more about automated health care data validations at civhc.org



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