



Electronic Case Reporting Data Validation and Quality Assurance, Connecticut, 2023: Use of PowerShell, XSLT, and Power Query to Improve Efficiency and Timeliness

Mike Schneider, MPH

Suzanne Speers, MPH

Nancy L Barrett, MPH MS

Connecticut Department of Public Health

2024 CSTE Annual Conference, June 2024, Pittsburgh, PA

Disclosures

- No financial interests
- Not an expert
- One possible solution

What's the problem?

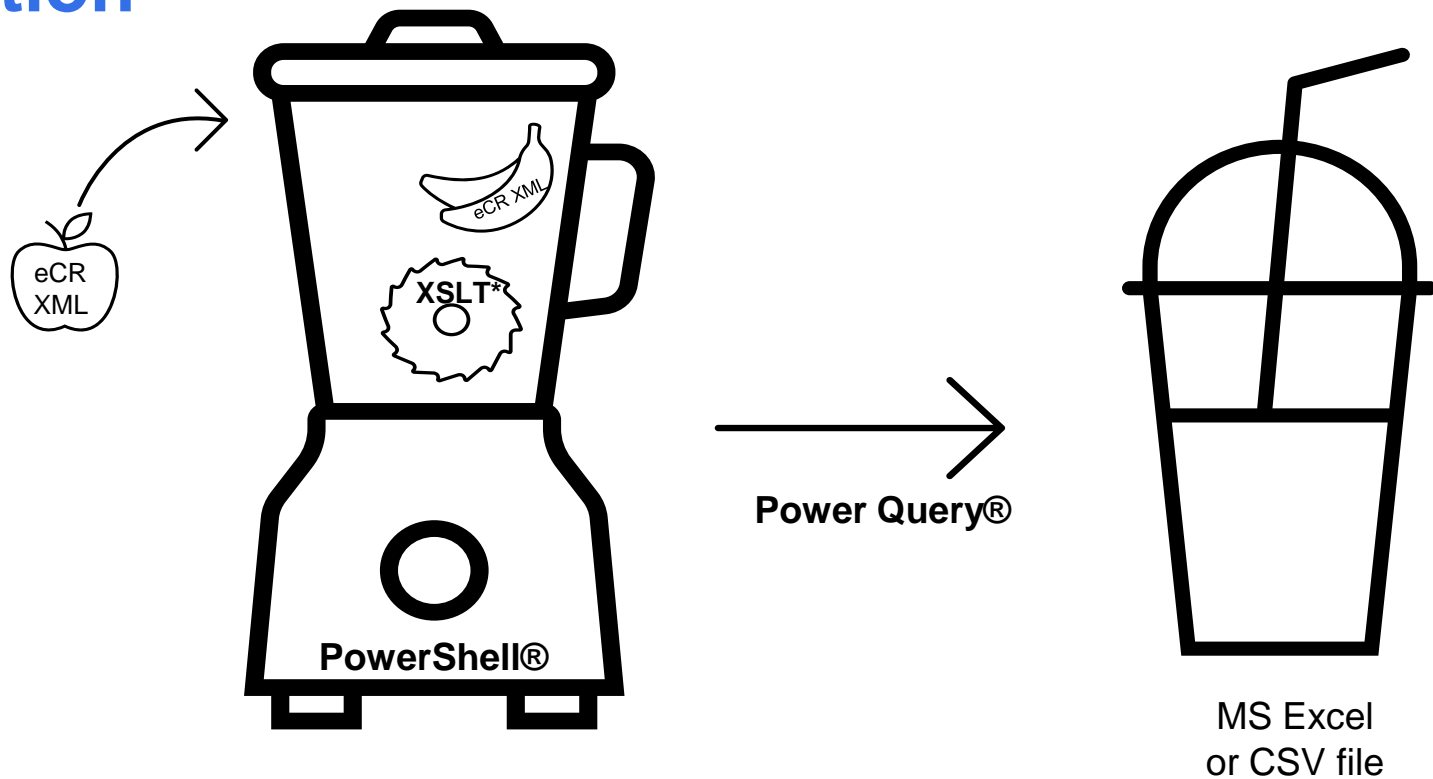
Challenges:

- No processing infrastructure
- Small team (2 people)
- At first, R access restricted
- Later, R scripts were slow
- DQ Schematron limitations

Needs:

- Testing
- Data validation
- Quality Assurance
- Efficiency

Solution

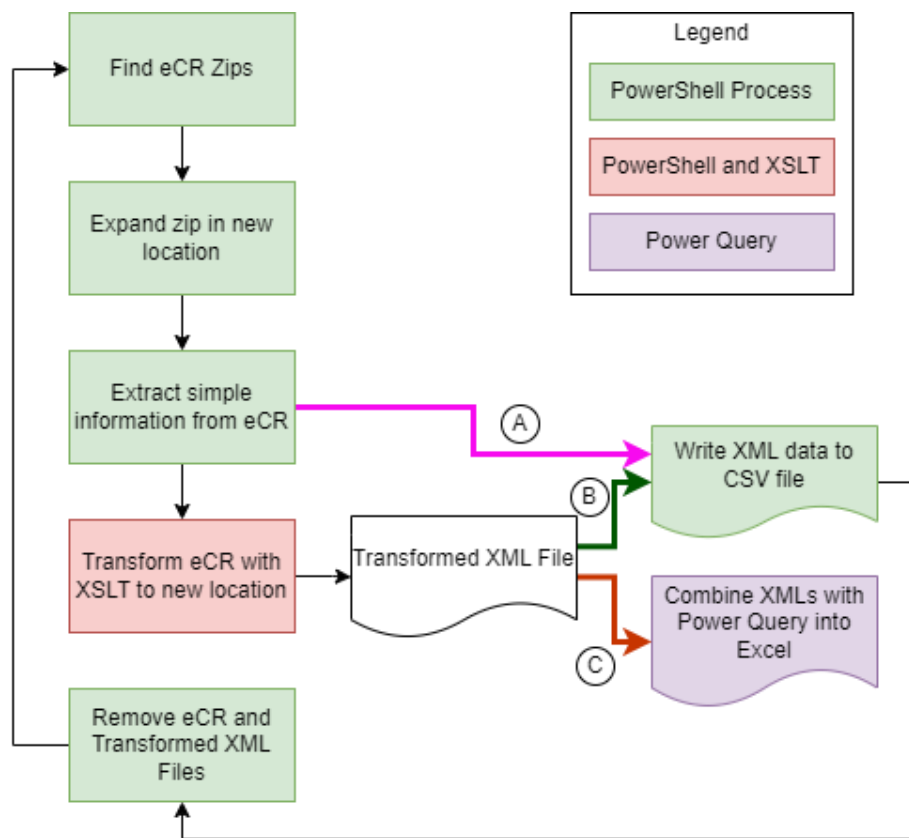


* XSLT= Extensible Stylesheet Language Transformations

How did we do it?

Three methods used:

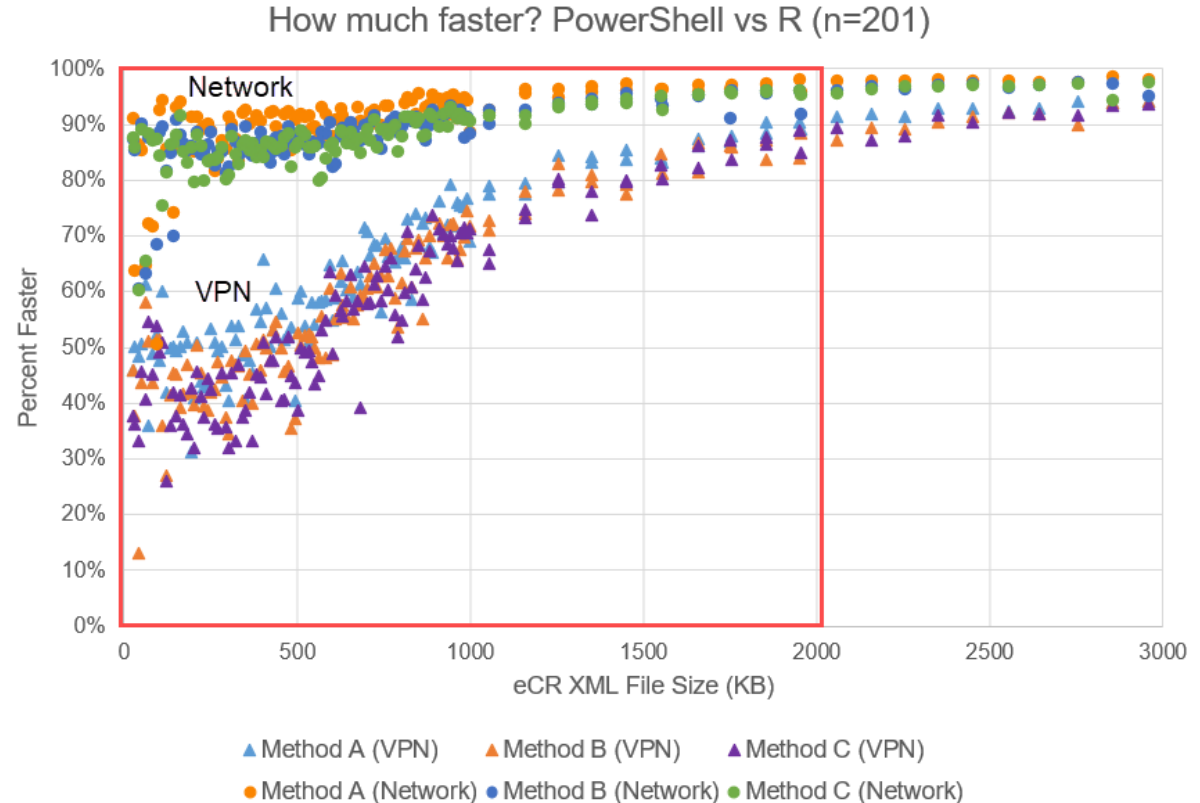
- A. Pull variables from eCR to CSV**
Good for **simple, non-repeating** elements
- B. Transform eCR and Write to CSV**
Good for elements that can be **repeating**.
Can be made very specific.
- C. Transform eCR and use Power Query® to combine output XMLs**
Good for **displaying** repeating elements
(meds, problems, etc.). Can be very specific
if needed.



Efficiency

Parsing the same elements:
PowerShell® compared to R
>**3X faster** over VPN
>**16X faster** on state network

Approx. >90% of eCRs will
fall between 0-2000KB
(based on a 3-month sample period)

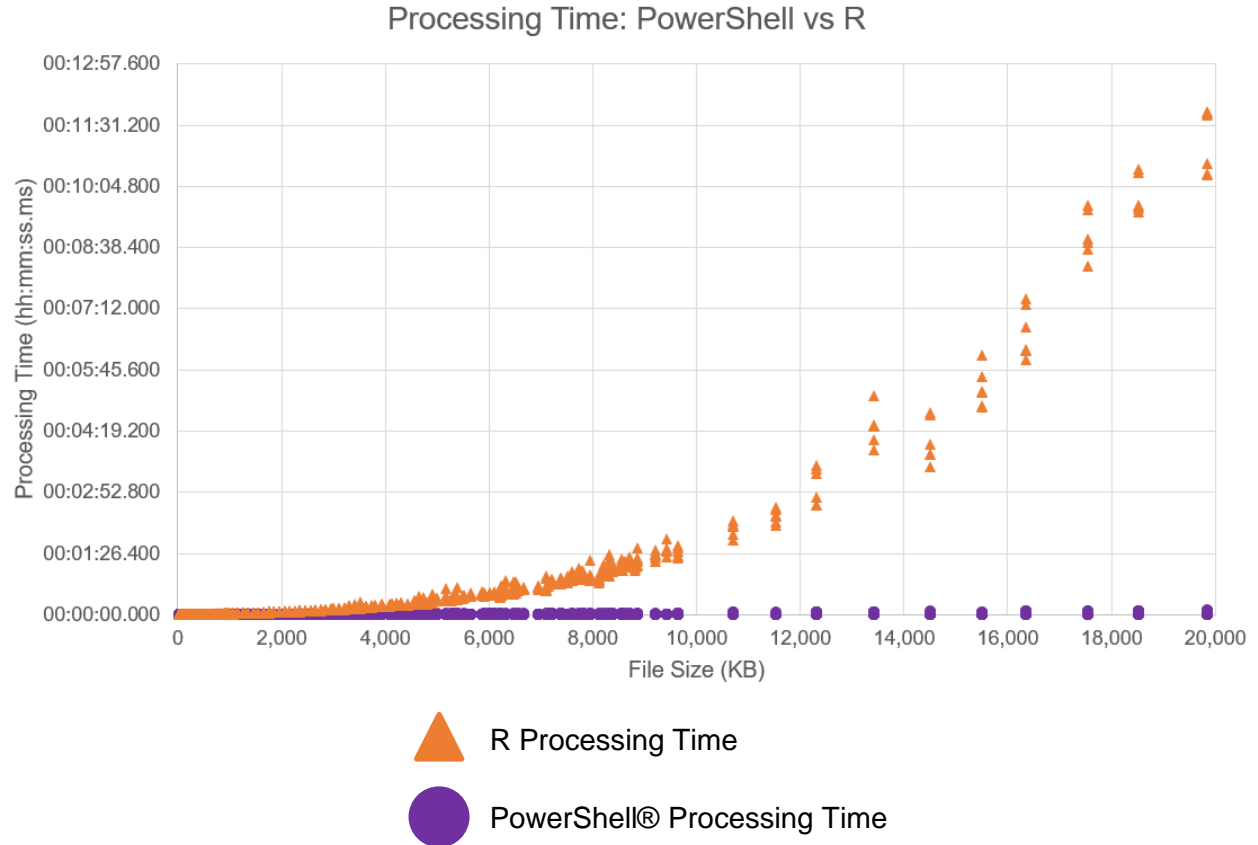


Speed

Maximum File Processing Time

PowerShell = **6.4 seconds**

R = **11 min 50 sec**



Utility

- It worked!
- Compared elements across different senders
- Functions as a sandbox for testing Xpaths
- **Able to test rules not in DQ Schematron**

| Sender | Count of eCRs | Ordered Lab Tests | Planned Procedures | Ordered Lab Tests per eCR | Planned Procedures per eCR |
|--------|---------------|-------------------|--------------------|---------------------------|----------------------------|
| HCO-A | 2,497 | 23,942 | 137 | 9.59 | 0.05 |
| HCO-B | 10,276 | 0 | 51,319 | 0.00 | 4.99 |
| HCO-C | 104 | 0 | 863 | 0.00 | 8.33 |
| HCO-D | 858 | 4,010 | 1,864 | 4.67 | 2.17 |

eCRs received from 01Jan24-01Mar24

Flexibility

- Search for filename and copy to a new location
- Search for condition codes in the Reportability Response
- Transform eCRs into extracted HTMLs for staff
- Compare codes in eCRs to surveillance system mappings using look up documents
- Make your script talk and freak out your coworkers

```
Add-Type -AssemblyName System.Speech
$synth = New-Object -TypeName System.Speech.Synthesis.SpeechSynthesizer
$synth.SelectVoice("Microsoft David Desktop")
$synth.Speak("Your script is done, and I am a sentient machine. Bow down to the computer overlords.")
```

Conclusion

- ☒ Alternative to R scripts
- ☒ Validation/ QA/ Testing
- ☒ Efficient and Fast
- ☒ A Usable Option

Thank You

- Lynn Sosa, MD
- Sue Speers, MPH
- Nancy L Barrett, MPH MS
- Informatics Team
- CSTE

Contact and Resources

Mike Schneider

CT Dept of Public Health

Michael.Schneider@ct.gov

DPH.eCRInformatics@ct.gov

<https://github.com/mikeeschneider/CSTE2024>

