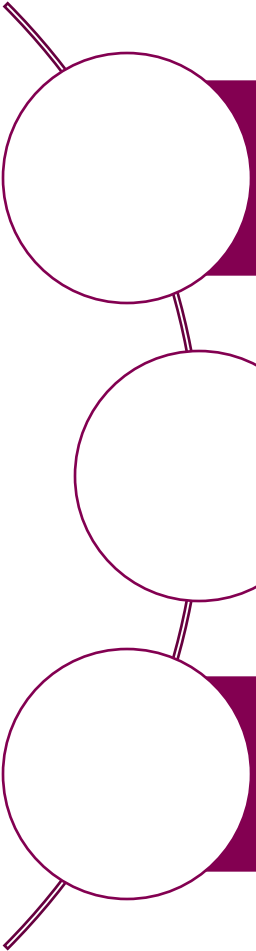


Leveraging Generative AI for SAS Macro Testing and Test Data Preparation

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PHUSE EU Connect 2025



Motivation

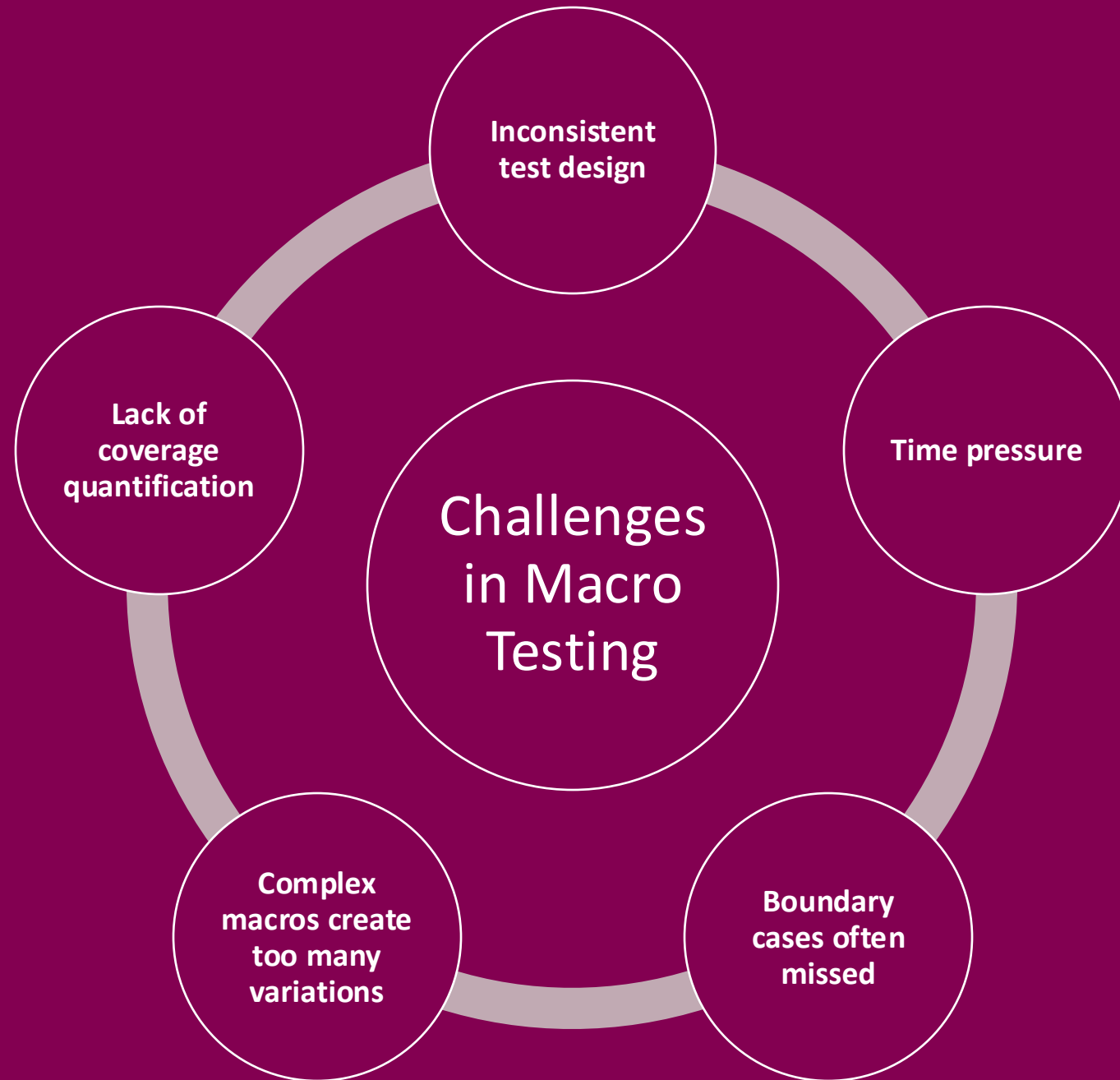


SAS macro validation is critical in clinical programming

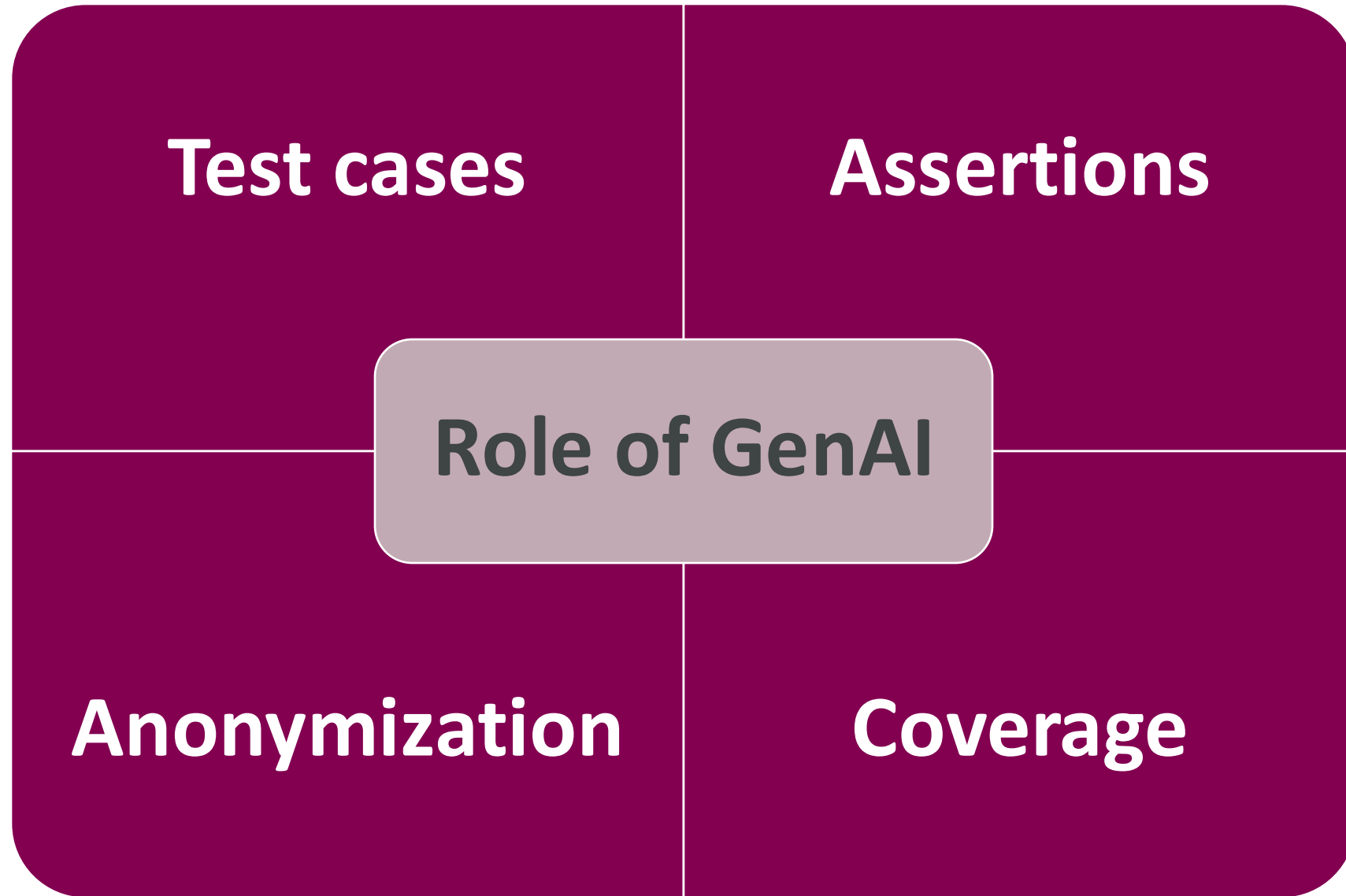
Errors can cascade into incorrect outputs, compliance issues, and rework

Traditional testing is manual, slow, and incomplete









Methodology – Prompting Strategy



Role



Task



Requirements



Constraints



Output



Example Macro – %lbctcae

Purpose:

Assigns CTCAE grades to lab results

Design:

Multiple parameters, flags, dependencies

Complexity makes it a good test case

```
%macro lbctcae(  
    dataIn    = adlb,  
    whereClause = ,  
    dataModel = adam,  
    dataOut    = ,  
    testcdVar  = lbtestcd,  
    resNumVar  = ,  
    resCharVar = ,  
    resUnitVar = ,  
  
    ...  
    ulnVar    = ,  
    llnVar    = ,  
    nrindVar  = ,  
    baseFlVar = ,  
    toxgrVar  = ,  
    toxgrnVar = ,  
    debug     = no  
);
```



AI-Generated Test Cases (Examples)

/* Routine */

```
%lbctcae(dataIn=adlb, dataOut=out1, ulnVar=uln, llnVar=lln, toxgrVar=toxgr);
```

/* Boundary */

```
%lbctcae(dataIn=adlb, dataOut=out2, ulnVar=, llnVar=, toxgrVar=toxgr);
```

/* Errors */

```
%lbctcae(dataIn=adlb, dataOut=out3, visitDate=adt, toxgrVar=toxgr);
```

```
%lbctcae(dataIn=adlb, dataOut=out4, ulnVar=lln, llnVar=uln, toxgrVar=toxgr);
```



AI Support for Test Data Preparation (Examples)

/ Critically high values */*

```
aval = anrhi * (3 + ranuni(12345));
```

/ Borderline low value */*

```
aval = anrlo * (0.89 + ranuni(67890)*0.1);
```

/ Negative values */*

```
aval = -abs(ranuni(78901) * anrlo);
```

/ Problematic text values */*

```
avalc = 'NOT DONE'; aval = .;
```



Observed Benefits



Efficiency:
less manual effort



Coverage:
more scenarios
explored



Quality:
earlier detection
of issues



Challenges & Limitations



AI output can be flawed



Limited context for large macros



Variability across models/prompts



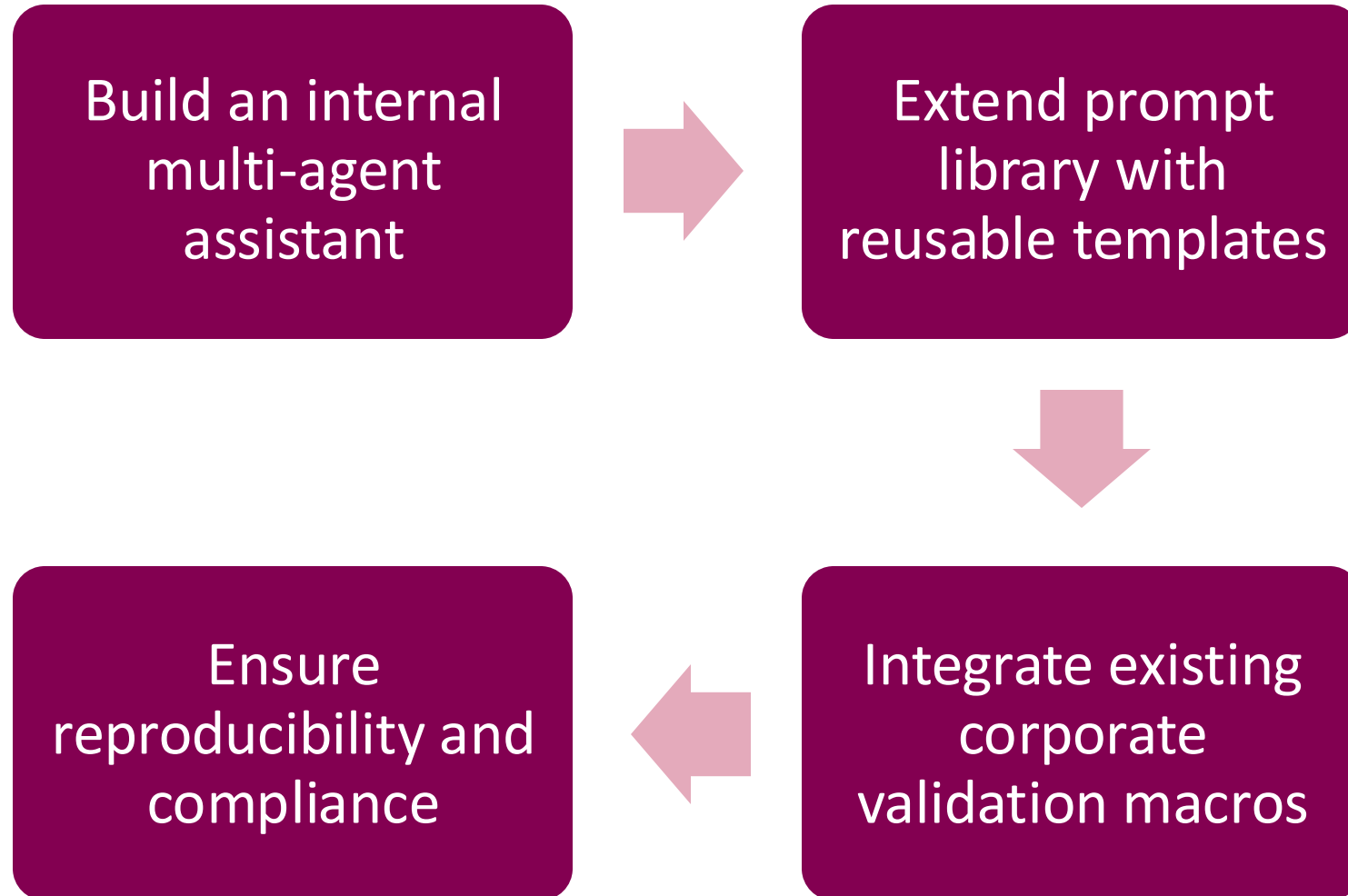
Synthetic data drift or bias



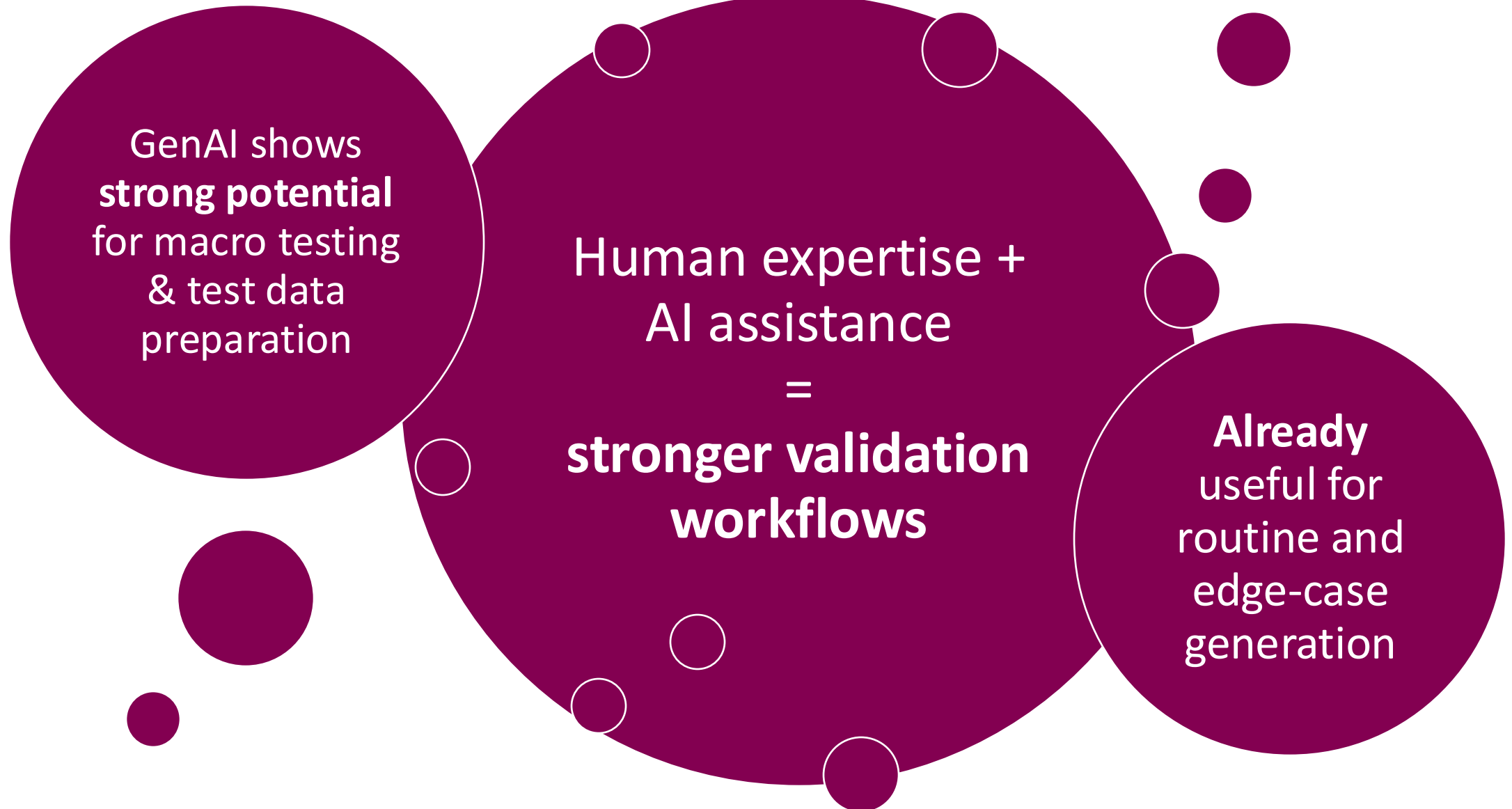
Human review is essential



Future Directions



Conclusion



Q&A



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