

DATA STORYTELLING

A CRUCIAL
LEADERSHIP SKILL IN
TODAY'S CLINICAL
RESEARCH LANDSCAPE

BHAVESH PATKAR -Syneos Health, India
BRIAN THORNTON-Spaulding Clinical, USA



INTRODUCTION

What is Data Storytelling

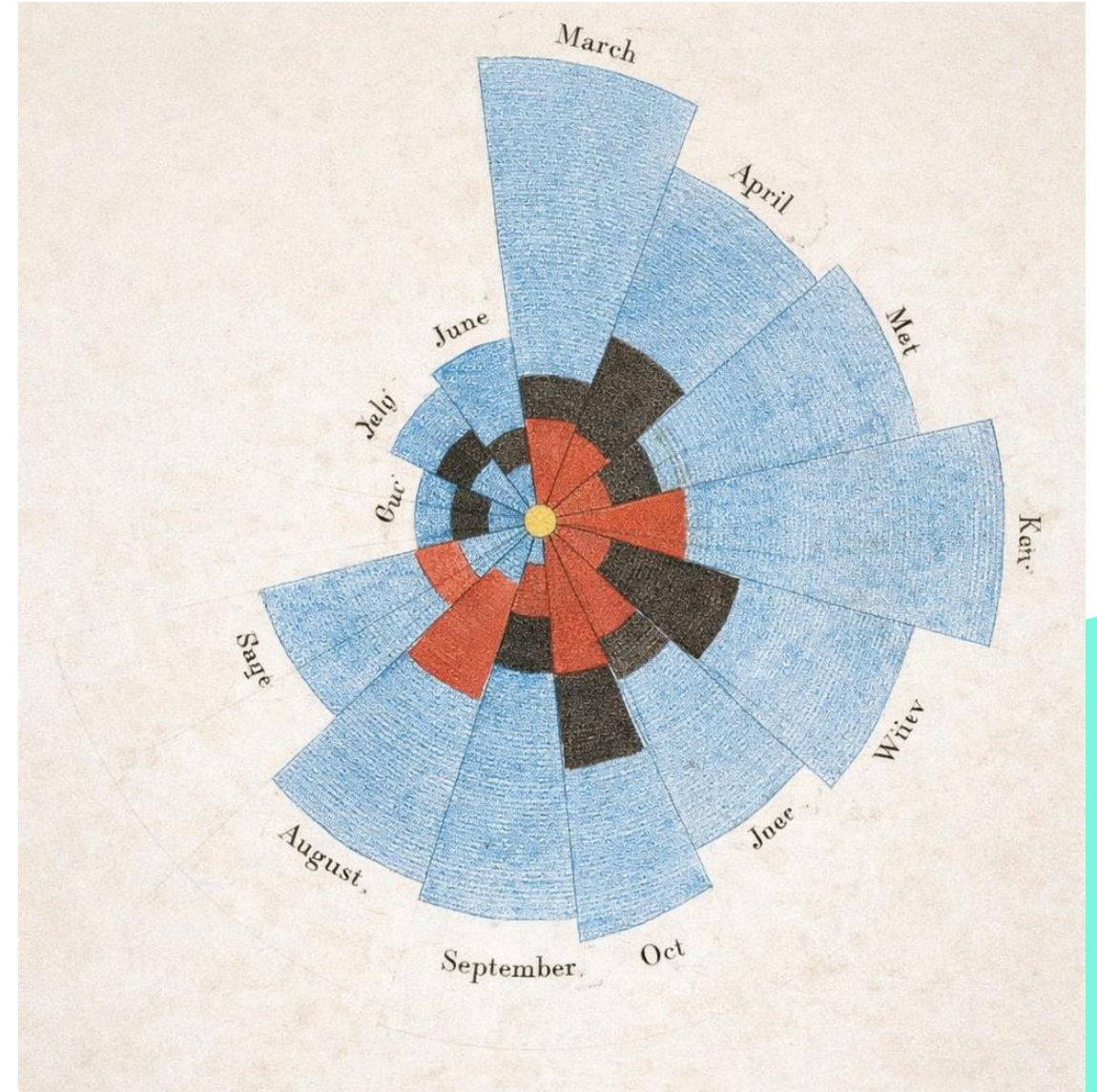
- Not a modern skill
- The tale of Florence Nightingale

Why Data Storytelling

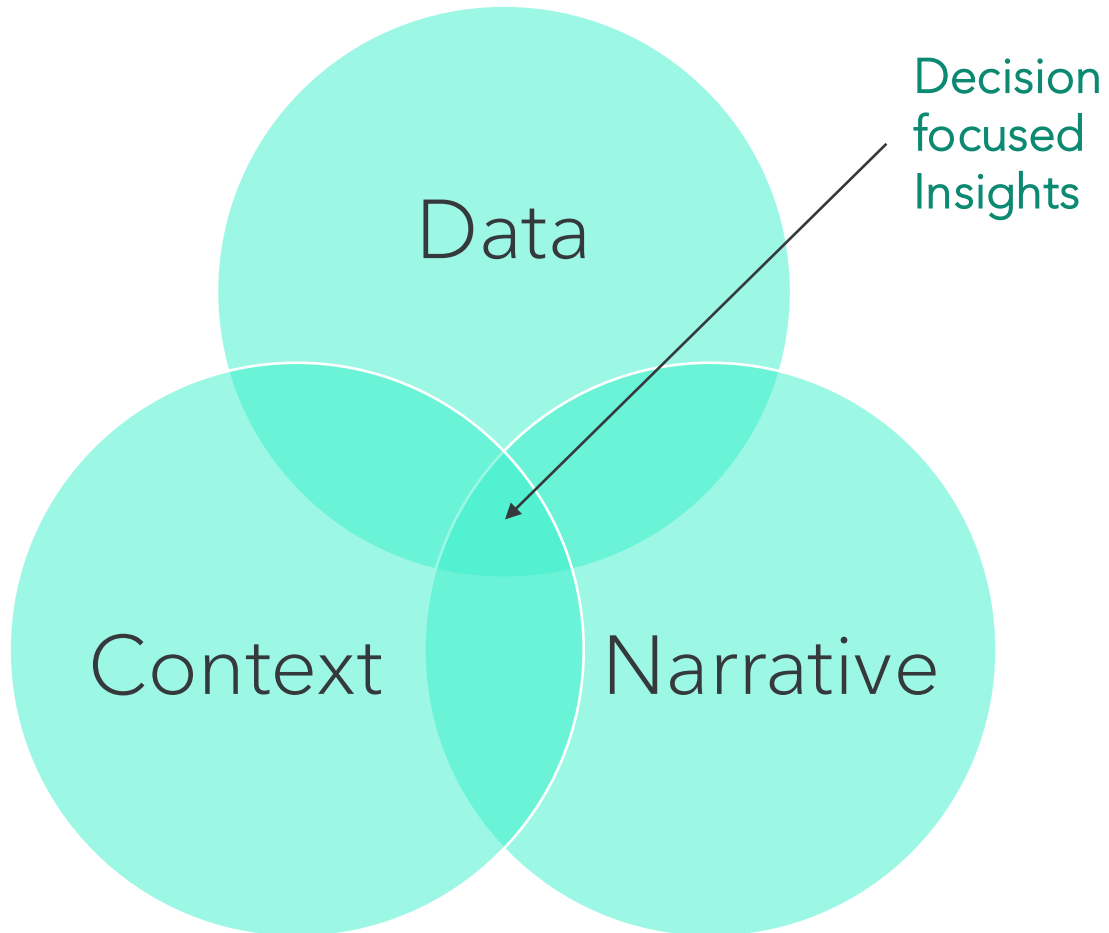
- Accurate data alone is rarely sufficient to drive action
- More data $\neq$ Better decision

Data Storytelling in Clinical Research

- Stats Output & TLFs $\neq$ Insights
- Data $\rightarrow$ Information $\rightarrow$ Insight $\rightarrow$ Decision



STORYTELLING WITH PURPOSE, NOT OVERSIMPLIFICATION



- Story telling is **not Oversimplification**; it does not remove complexity
- Modern data storytelling should **complement; not substitute - detailed analyses**
- Data storytelling involves **tailoring the narrative to align with the audience's** priorities, expertise, and decision-making responsibilities; while ensuring that **scientific conclusions remain consistent** across communications.

STORYTELLING AS A LEADERSHIP SKILL

- Data Storytelling is **not just a presentation skill** or technical skill
- It reflect **Leadership maturity**
 - Who is listening
 - What decisions they own
 - What clarity they need
- **Anticipate** Questions
- Address uncertainty **transparently**
- Build **Trust** with audience
- **Guide** Interpretation



THE DATA STORYTELLING PROCESS

1

CONTEXT

Who is audience?
What is objective?
What decision?

2

APPROPRIATE DISPLAY

Visual Representation
Different chart → Different
Interpretation

3

ELIMINATE CLUTTER

Distraction from Insight
Cognitive burden
Obsure findings

4

DRAW ATTENTION

Highlight what matters
Patterns, Trends, Threshold
Insights without bias

5

DESIGN

Layout, Color, consistency
Supports credibility
Thoughtful design = Intent

6

STORY

Connecting context
Visual & Narrative flow
Coherent Message

BALANCING ACCURACY & ACCESSIBILITY



Risks of Over-Simplification

- Loss of nuance or misinterpretation
- Clarity must not come at the expense of accuracy

Risks of Over-Complexity

- Complexity Overwhelms & masks findings
- Accessibility is component of Impact & not a compromise of rigor

Layered Communication

- Information at multiple levels of detail
- Engage audience according to their role and expertise

Transparency & Trust

- Clear communication of assumptions
- State Limitations
- Disclose uncertainty

REAL WORLD EXAMPLES

1

Safety Signal Communication



A higher incidence of a specific adverse event is observed in the treatment arm

Ineffective Storytelling:

Safety data are presented as dense tables with equal emphasis on all adverse events and minimal clinical context. Stakeholders struggle to identify relevance, leading to either overreaction or delayed interpretation.

Adverse Events Summary			
Adverse Event	Placebo (N=150) n (%)	Treatment (N=160) n (%)	Total (N=310) n (%)
Headache	23 (15.3)	28 (17.5)	51 (16.5)
Nausea	17 (11.3)	30 (18.8)	47 (15.2)
Fatigue	14 (9.3)	22 (13.8)	36 (11.6)
Dizziness	10 (6.7)	18 (11.3)	28 (9.0)
Rash	8 (5.3)	15 (9.4)	23 (7.4)
Diarrhea	12 (8.0)	20 (12.5)	32 (10.3)
Vomiting	6 (4.0)	14 (8.8)	20 (6.5)
Insomnia	4 (2.7)	11 (6.9)	15 (4.8)
Chest Pain	7 (4.7)	10 (6.3)	17 (5.5)
Elevated Liver Enzymes	16 (10.7)	24 (15.0)	40 (12.9)
Hypertension	7 (4.7)	18 (11.3)	14 (4.5)
Cough	15 (10.0)	9 (5.6)	33 (10.6)
Back Pain	13 (8.7)	9 (5.6)	21 (6.8)
Fever	13 (8.7)	9 (5.6)	21 (6.8)
Constipation	6 (4.0)	8 (5.0)	20 (6.5)
Anxiety	11 (7.3)	10 (6.3)	25 (8.1)
Other Adverse Events	29 (19.3)	39 (22.5)	65 (21.0)

*TEAE = Treatment-Emergent Adverse Event
Data presented as n (%).

REAL WORLD EXAMPLES

1

Safety Signal Communication



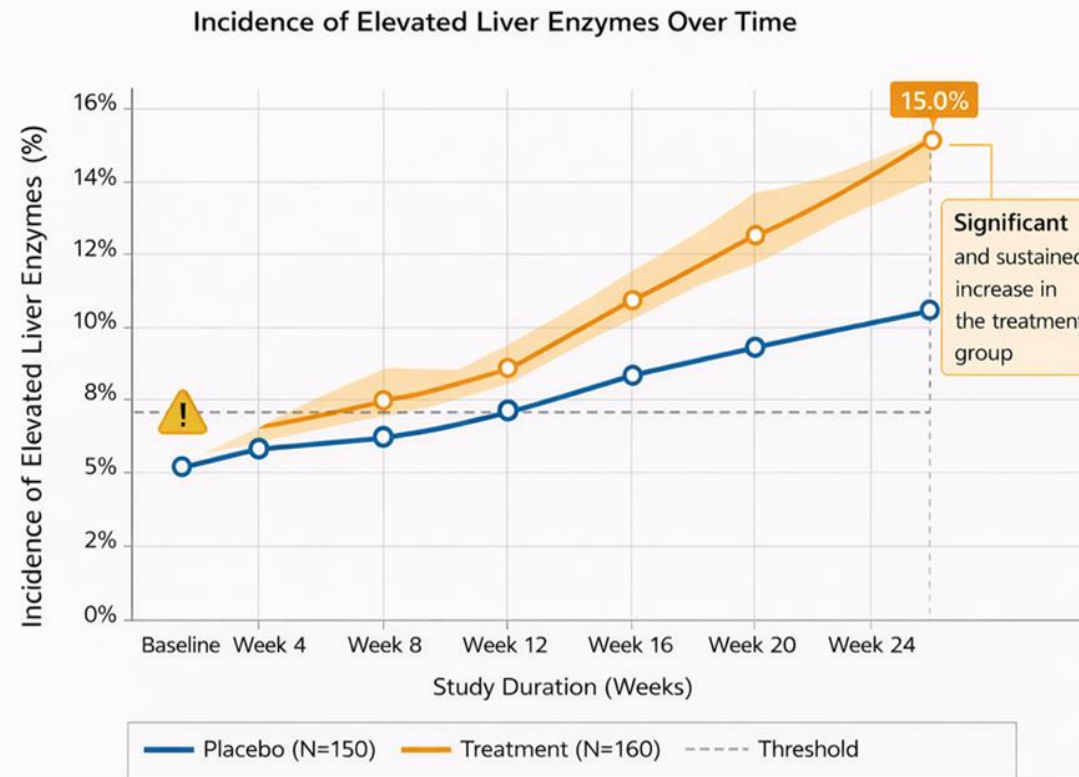
A higher incidence of a specific adverse event is observed in the treatment arm

Effective Storytelling:

The same data are reframed with a focused visual highlighting the event of interest, supplemented by temporal context and relevant benchmarks. The narrative explicitly addresses clinical relevance and uncertainty.

Leadership Impact:

Clear storytelling supports proportionate, timely safety decisions while maintaining transparency.



REAL WORLD EXAMPLES

2

Bioequivalence Interpretation



A bioequivalence analysis compares capsule and caplet formulations for two drugs

Ineffective Storytelling:

Bioequivalence results are presented as a comprehensive statistical table assigning equal visual weight to all values and requires readers to mentally apply acceptance criteria and infer conclusions.

Results – Summary of Bioequivalence Main Analysis

Summary of Bioequivalence Main Analyses PK Population							
Analyte Parameter (units)	Capsules (Treatment A, Test)		Caplets (Treatment B, Reference)		LSGMR (Test/Reference) %	90% Confidence Interval	
	N	LSGM	N	LSGM		Lower	Upper
Drug 1 (ng/mL)							
AUC _{0-t} (h*ng/mL)	45	82497.75	43	75735.54	97.38	96.28	100.41
C _{max} (ng/mL)	45	33087.42	43	23451.09	137.45	131.00	145.31
Drug 2 (ng/mL)							
AUC _{0-t} (h*ng/mL)	45	28393.43	43	23532.57	104.92	102.30	108.23
C _{max} (ng/mL)	45	8675.81	43	7657.31	112.71	106.32	117.54

Abbreviations: CV%, percent coefficient of variation; ln, natural logarithm; LS, least squares; LSGMR, least squares geometric mean ratio; PK pharmacokinetic. The primary analyses included comparisons of test treatment (capsules [Treatment A]) and reference treatment (Caplets [Treatment B]) using a mixed-effects analysis model to evaluate the effect of treatment, sequence and period as fixed effects, and subject nested within sequence as a random effect for PK parameters C_{max} and AUC_{0-t}. PK parameters were ln-transformed for analysis and have been back transformed in table presented above. Only the treatments of interest were included in the model (Treatment A and Treatment B). An available case analysis was performed using all observed data. Bioequivalence is determined by the 90% confidence interval of the LSGMR for C_{max} and AUC_{0-t}, if LSGMR falls completely within the range 80.00-125.00%. This indicates statistical equivalence between Capsules (Treatment A) and Caplets (Treatment B).

REAL WORLD EXAMPLES

2 Bioequivalence Interpretation

A bioequivalence analysis compares capsule and caplet formulations for two drugs

Effective Storytelling:

The visualization presents the same results in a decision-focused format that explicitly surfaces the conclusions relevant to regulatory and development decisions.

Leadership Impact:

By reframing dense statistical output into a decision-ready summary, leaders can quickly assess the implications of the analysis and focus discussion on next steps rather than numerical interpretation.

Results – Summary of Bioequivalence (Primary Analysis)

Analyte Parameter (units)	Capsules (Treatment A, Test)		Caplets (Treatment B, Reference)		LSGMR (Test/Reference) %	90% Confidence Interval	
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Abbreviations: LSGMR, least squares geometric mean ratio.
The primary analyses included comparisons of test treatment (Capsules [Treatment A]) and reference treatment (Caplet [Treatment B]) using a mixed-effects analysis model to evaluate the effect of treatment, sequence and period as fixed effects, and subject nested within sequence as a random effect for PK parameters above. PK parameters were ln-transformed for analysis and have been back transformed in table presented above.

For **Drug 1**, LSGMR for **AUC (97.38%)** and CI (96.28, 100.41) are within the accepted bioequivalence range of 80.00% to 125.00%, indicating equivalent exposure between Capsules and Caplets. However, the LSGMR for **Cmax (137.45%)** and CI (131.00, 145.31) are outside the bioequivalence acceptance range.

For **Drug 2**, LSGMR for **AUC (104.92%)** and **Cmax (112.71%)** and respective CI (102.30, 108.23) (106.32, 117.54) are within the accepted bioequivalence range of 80.00% to 125.00%.

REAL WORLD EXAMPLES

3

Financial Performance Metrics



Biometrics leaders are responsible for managing budgets and explaining variances to senior stakeholders.

Ineffective Storytelling:

Cost performance is presented as a detailed month-by-month, with no explanation for budget deviations, whether the variance is accelerating, and what this implies for year-end performance.

Cost Summary – 2025 (shown in \$K)
Actuals available through June only

Month	Budget Cost	Actual Cost	Difference (Actual – Budget)
Jan	100.0	100.0	0.0
Feb	101.0	100.5	-0.5
Mar	102.0	101.5	-0.5
Apr	103.0	106.0	+3.0
May	104.0	108.0	+4.0
Jun	105.0	110.0	+5.0
Jul	106.0	—	—
Aug	107.0	—	—
Sep	108.0	—	—
Oct	109.0	—	—
Nov	110.0	—	—
Dec	111.0	—	—
Total	1,266.0	626.0 (YTD)	+11.0 (YTD)

REAL WORLD EXAMPLES

3

Financial Performance Metrics



Biometrics leaders are responsible for managing budgets and explaining variances to senior stakeholders.

Effective Storytelling:

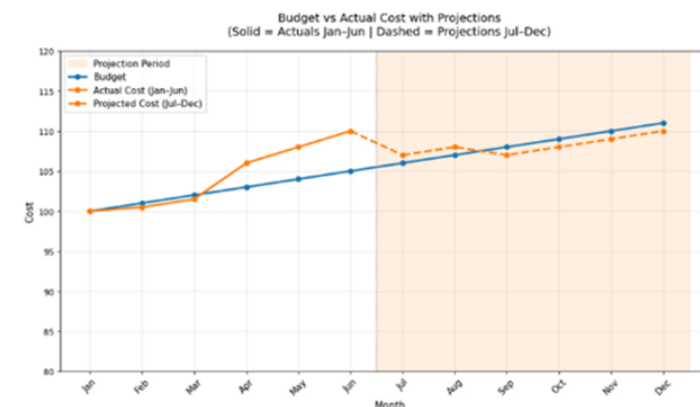
Financial Performance is reframed to separate confirmed historical performance from forward-looking projections. Narrative explains variances and forward-looking projections incorporate these assumptions, enabling assessment of future performance.

Cost Summary – 2025 (shown in \$K)
Actuals available through June only

Month	Budget Cost	Actual Cost	Difference (Actual – Budget)
Jan – Jun (Actual)	615.0	626.0	+11.0
Jul – Dec (Projection)	651.0	649.0	-2.0
Total	1,266.0	1275.0	+9.0

Reasons for Budget Overrun

- **Project Lynx** – Legacy project with additional unanticipated ad-hoc analysis, completed in June (\$4k)
- **Project Zebra** – New Critical project not in original budget, will complete in August (\$5k)
- **Project Aardvark** – Accelerated Start, originally slated for Sep-Dec, now completed in Apr-Jun. Net zero impact to budget for the year (cost shifted)



Leadership Impact:

Enables proactive financial management by shifting discussion from retrospective variance explanation to forward-looking decision-making.

PRACTICAL STRATEGIES FOR DEVELOPING DATA STORYTELLING SKILLS

Adopting storytelling mindset

- View Analyses as decision inputs than endpoints

Asking the right questions

- What decision this supports?
- Who is audience? What is primary message?

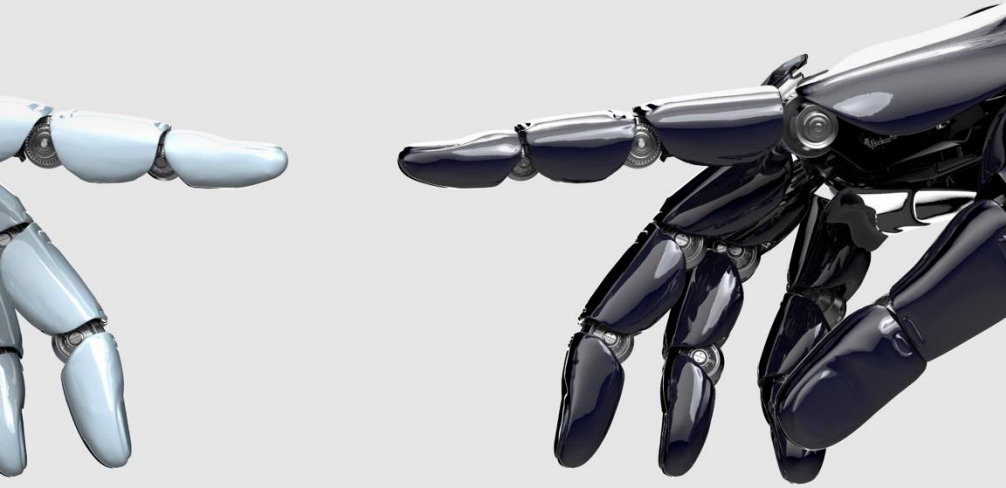
Applying principles consistently

- context, focus, and clarity across tables, figures, and presentations

Coaching teams

- Leaders modelling and reinforcing effective communication within teams

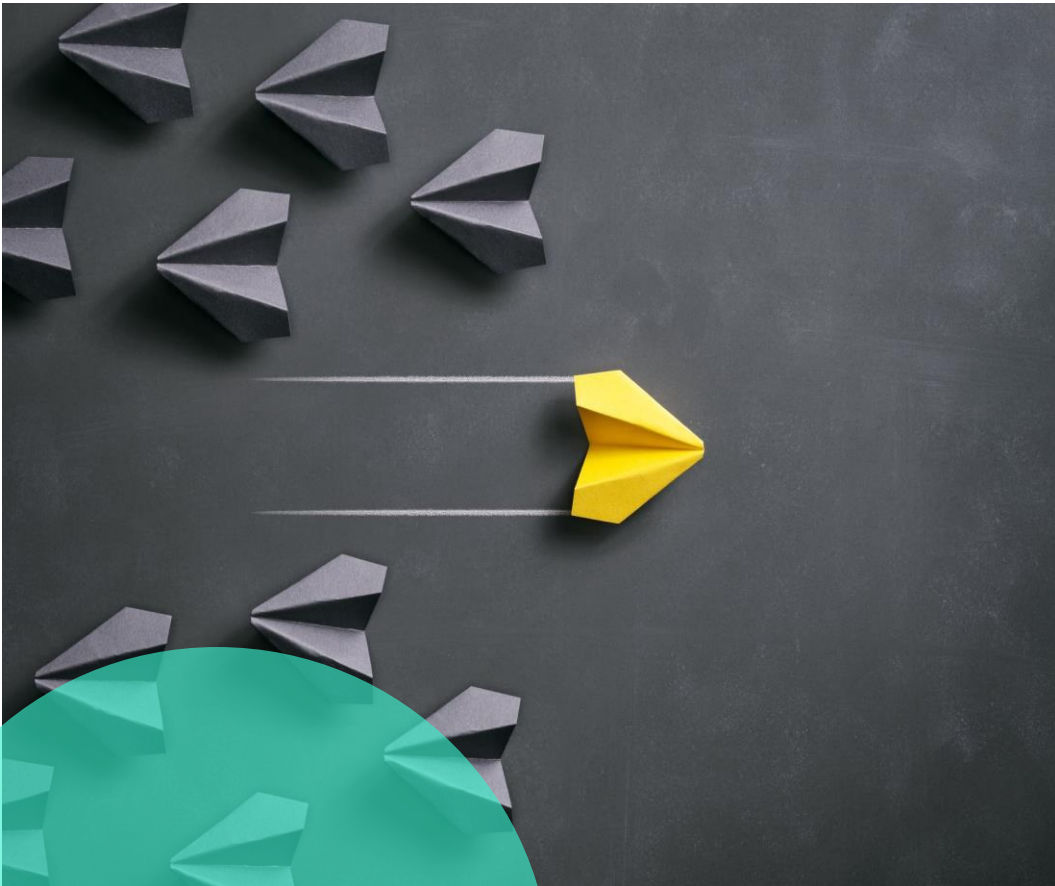




AI AS STORYTELLING COPILOT

- **Artificial intelligence can enhance data storytelling**
Draft Narrative, support structure, quality, iteration, summarization, tailor messaging.
- **Accountability for interpretation and decision-making must remain with human leaders**
AI content must be reviewed
- **Appropriate guideline for AI use**
AI copilot should enhance - not replace human judgment.

CONCLUSION



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In an increasingly complex clinical research environment, data storytelling has emerged as a critical **leadership capability**.

While technical rigor remains essential, the **ability to contextualize data, communicate clearly, and guide interpretation** determines whether analyses translate into meaningful decisions.

Q & A



Connect with the speakers:

BHAVESH PATKAR | Syneos Health, Hyderabad, India | Bhavesh.Patkar@syneoshealth.com



BRIAN THORNTON | Spaulding Clinical, West Bend WI USA | Brian.Thornton@spauldingclinical.com