

Revolutionizing Lyme Disease Management: Predictive Modelling and Diagnostic Innovations Unveiled

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Methods in
Molecular Biology 2742

Springer Protocols

Leona Gilbert *Editor*

Borrelia burgdorferi

Methods and Protocols

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 Humana Press

"TICKPLEX SAVED MY LIFE"

Joonas Berghäll Film Producer, Writer, and Director

PATIENT JOURNEY

12

years to get a
diagnosis

82

doctors

60,000 €

of out-of-pocket
expenses

Joonas received a **personalized treatment** protocol based on TICKPLEX and now he is **95% recovered**.



A cross-disciplinary compendium of techniques tailored to probe the intricacies of the Lyme disease bacterium *Borrelia burgdorferi*.

This resource meticulously compiles standard and avant-garde methods, accessible to novices and veteran scientists alike, for robust *in vitro*, *in vivo*, *in situ*, *de novo*, and clinical investigations.

Join us in advancing the frontier of infectious disease methodology.

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#ScientificInquiry

#MolecularBiologyExcellence

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Chapter 15: Building a Binary Classification Machine Learning Model: A guide to Predicting Participation in a Lyme Disease Program at a Medical Institute

Kunal Garg, Liria Mitzuko Fajardo-Yamamoto, Flor Cecilia Rojas-Castro, Teo Susnjak, and Leona Gilbert

Chapter 16: Clinical Algorithm and Diagnostic Tools for Lyme Disease

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Patient Database

***Allows for streamlined access to patient histories**

***Enabling personalized treatment plans and faster decision-making**

***Significantly improve research opportunities, leading to breakthroughs in medicine**

By leveraging data, healthcare providers can predict trends, prevent illnesses, and improve overall patient care.



Te?ted

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Patient Database is crucial for enhancing healthcare delivery and outputs to patients.

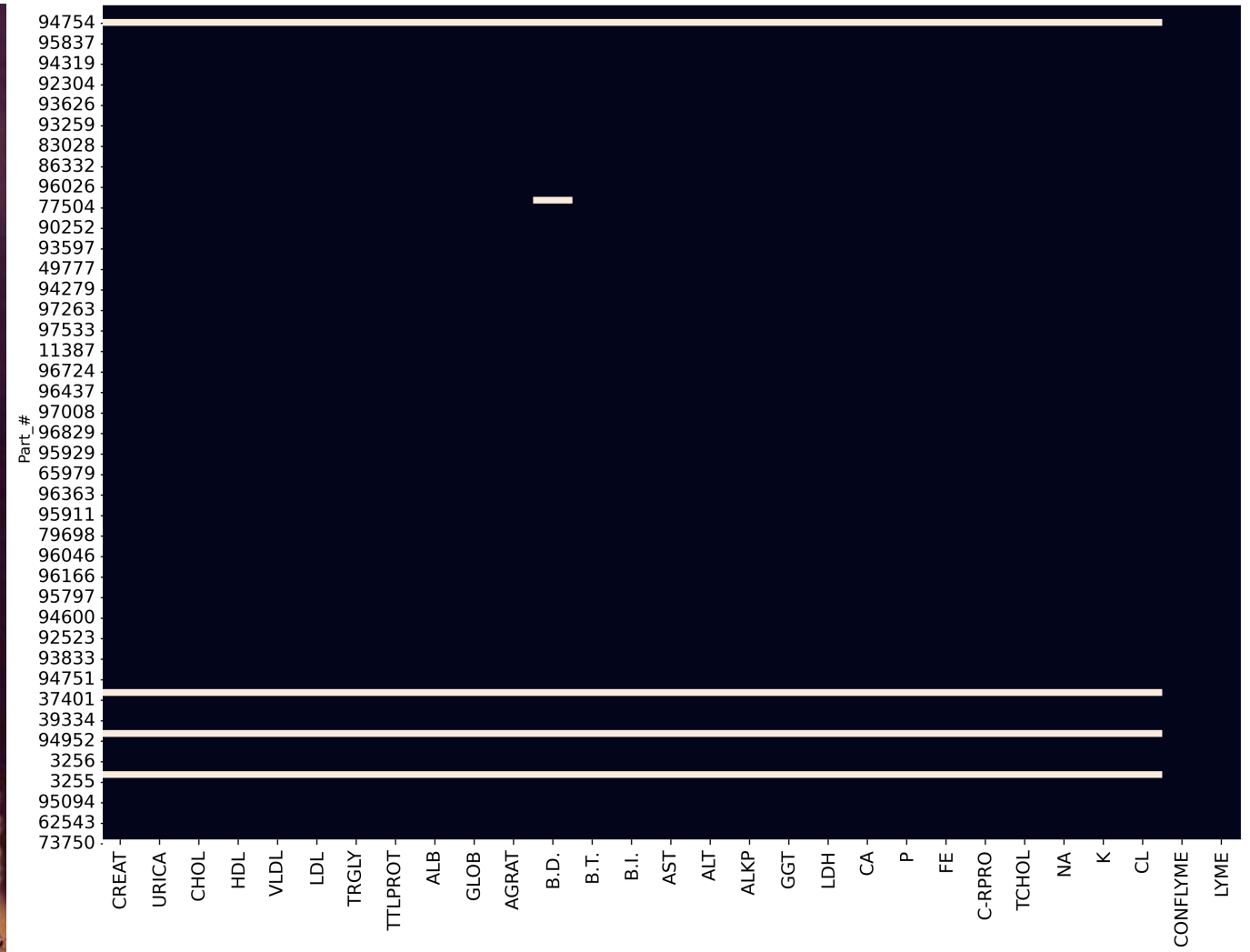


Building a Binary Classification Machine Learning Model:

A guide to Predicting Participation in a Lyme Disease Program at a Medical Institute



Data cleaning is 80% of the battle!



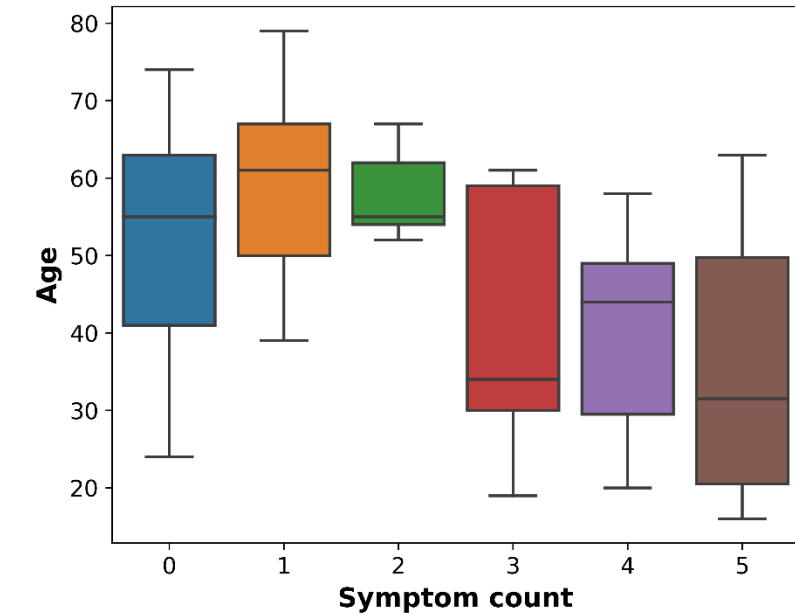
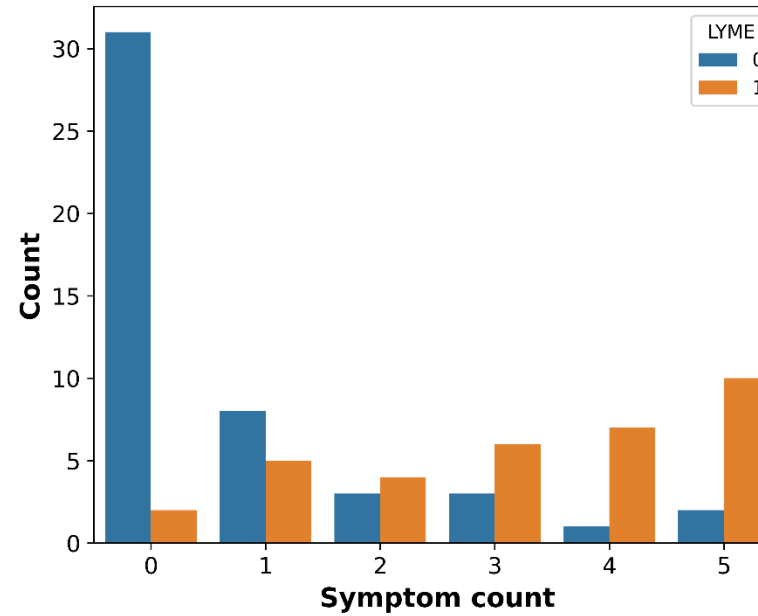
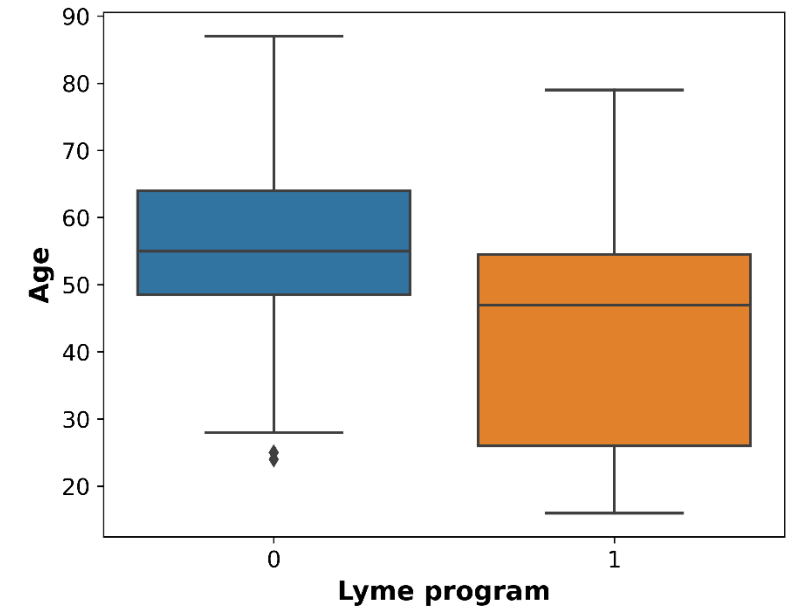
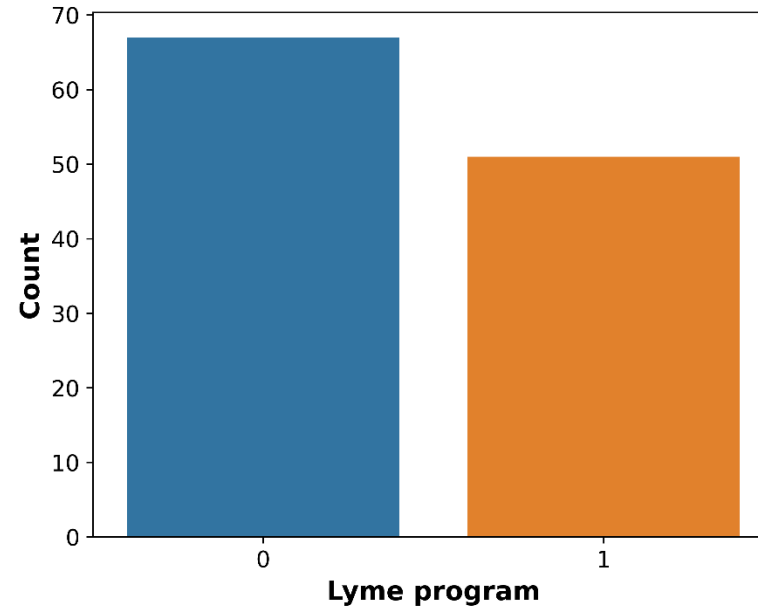
Database

70/30

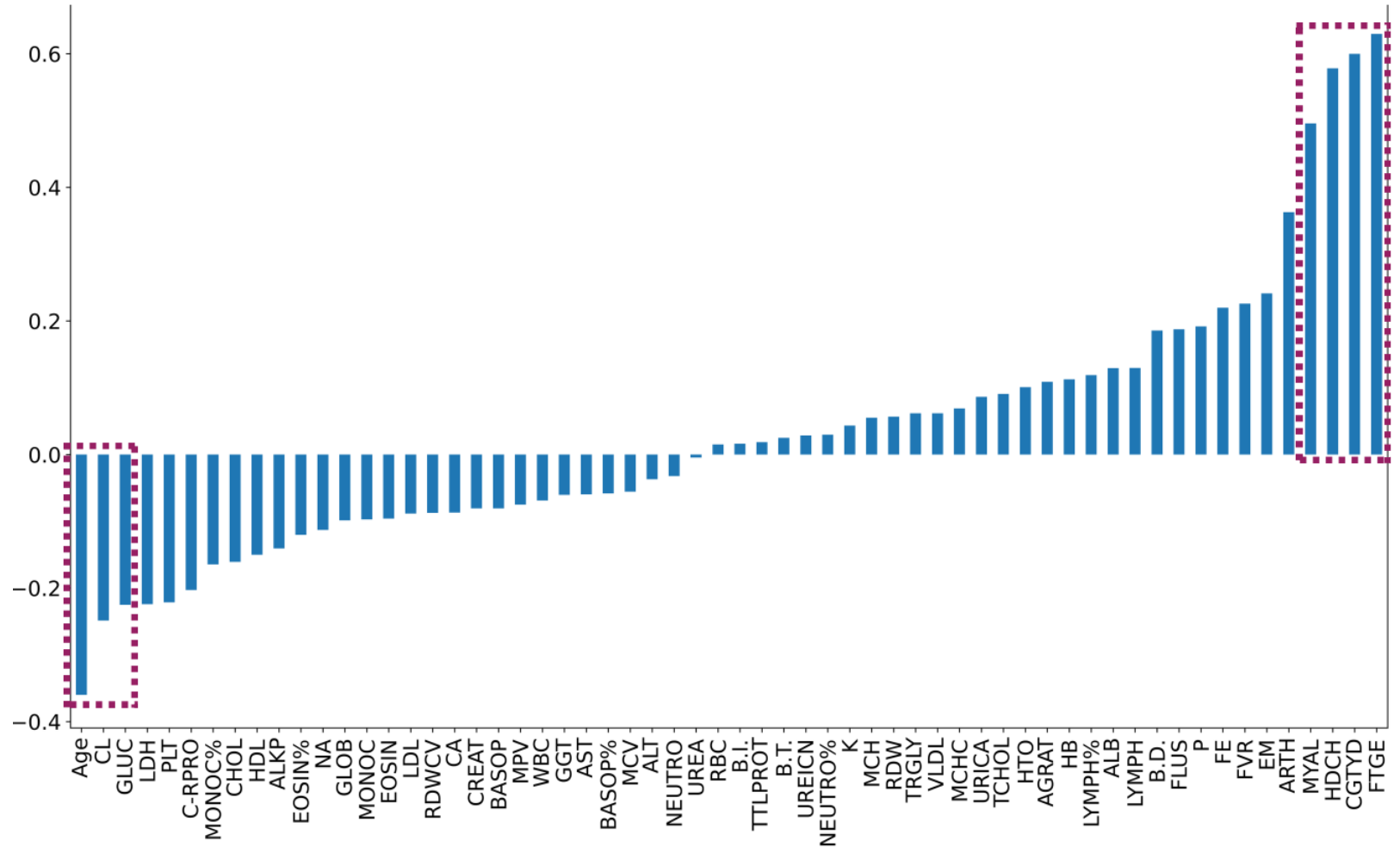
70% → Training
30% → Testing

60 variables from
122 patients:

- Demographic
- Symptoms
- Complete blood count
- Blood chemistry



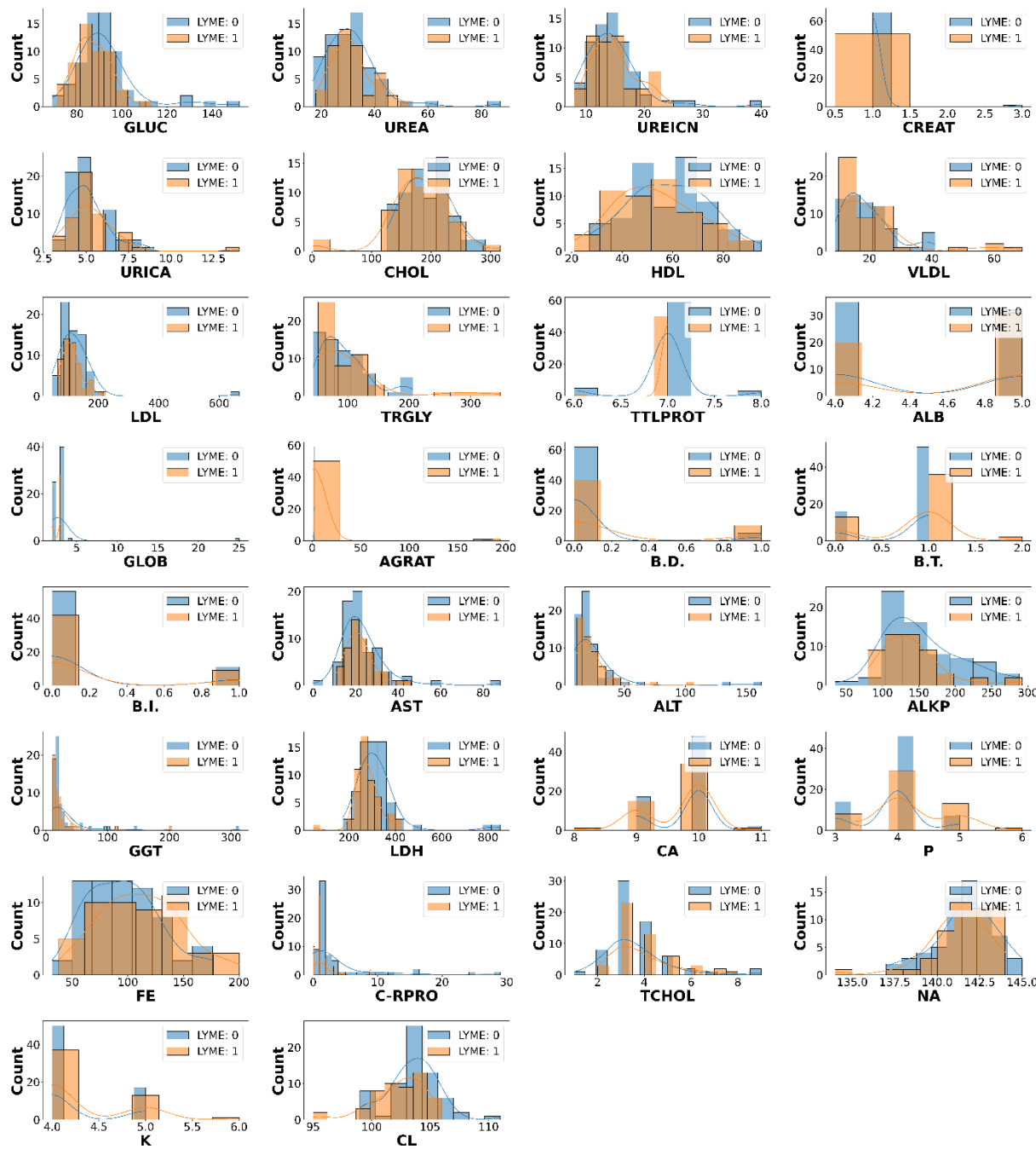
Classical Statistics



Pearson correlation between independent features in the dataset and the target variable: LYME

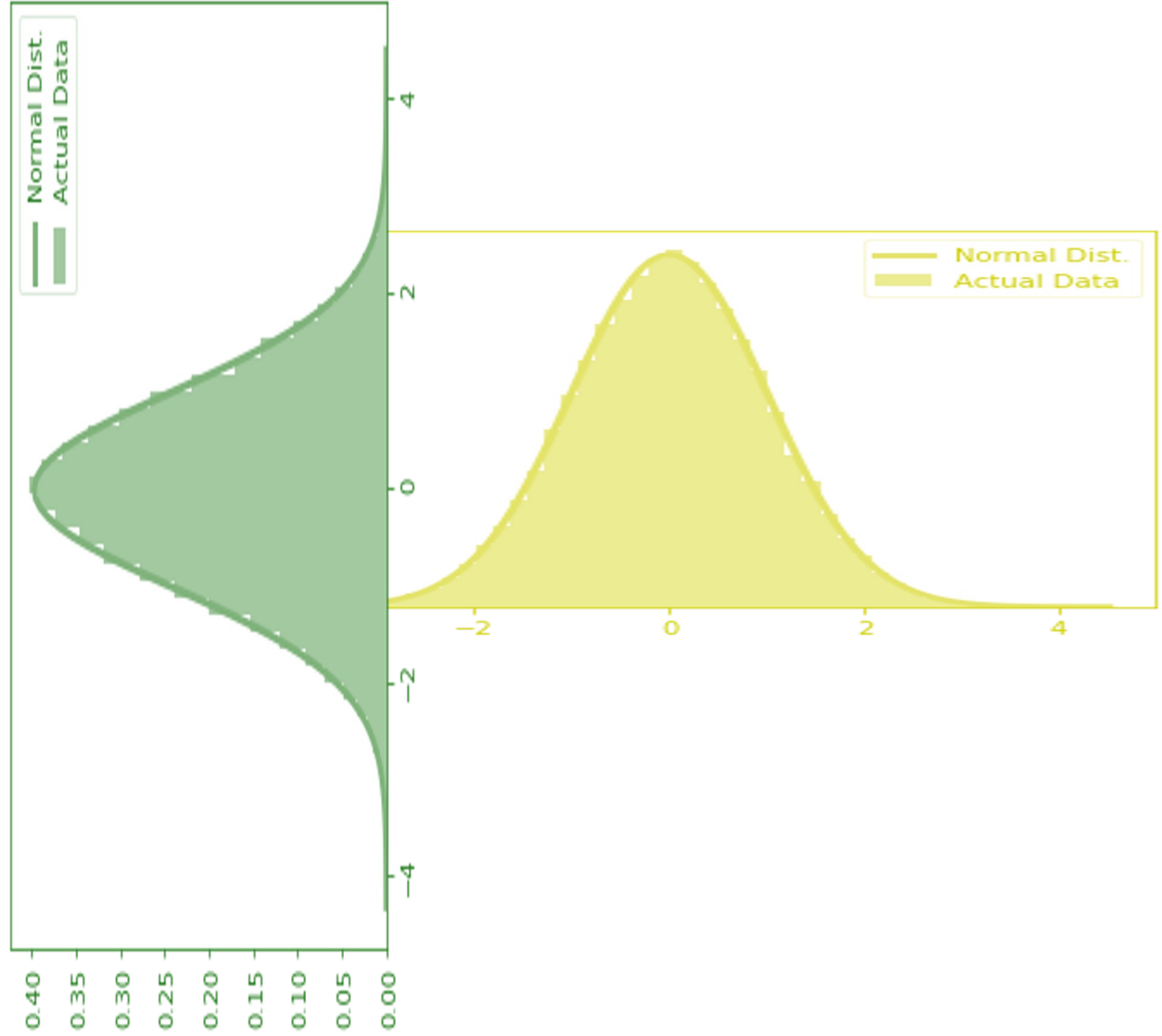
Traditional way

Trends? Patterns?

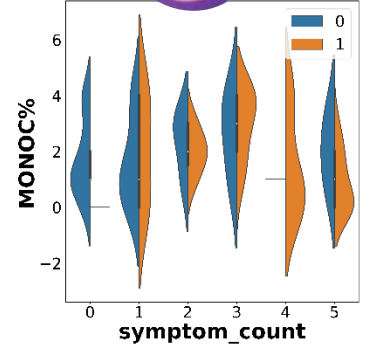
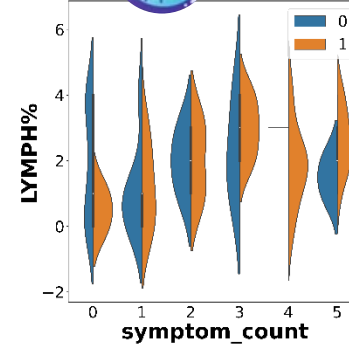
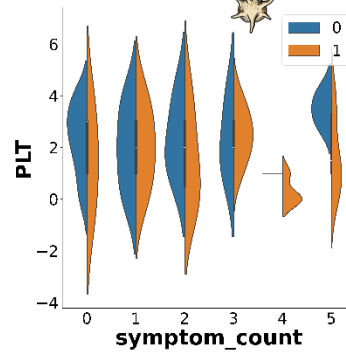
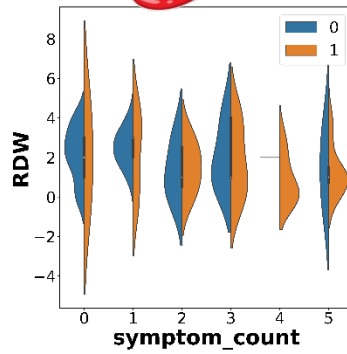


Machine Learning:

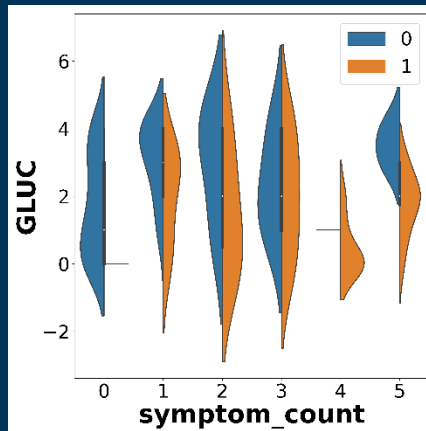
Other correlation?



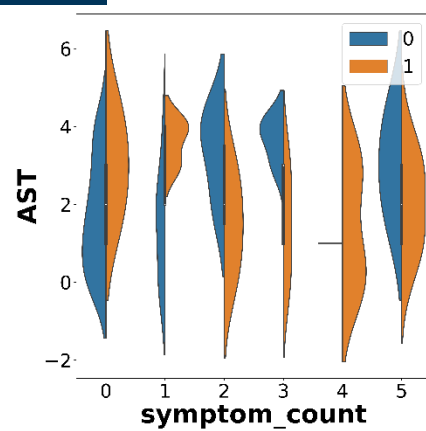
Patterns in Blood Count & Blood Chemistry



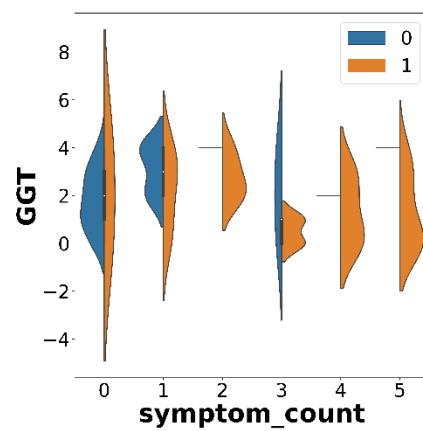
Glucose



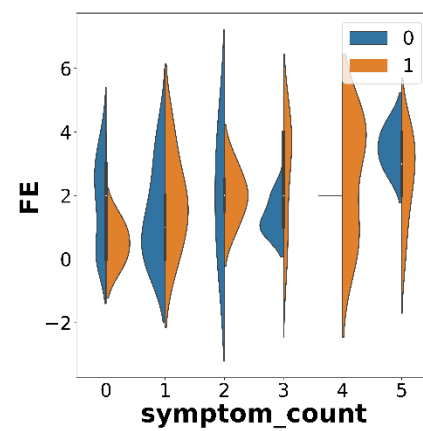
AST



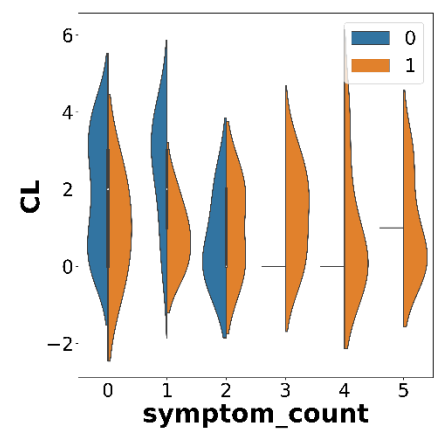
GGT



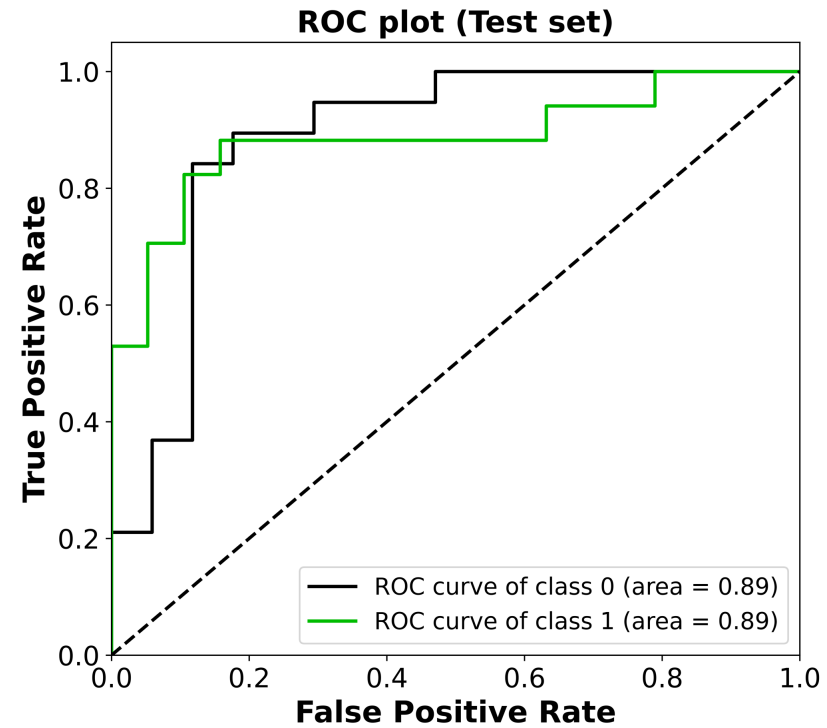
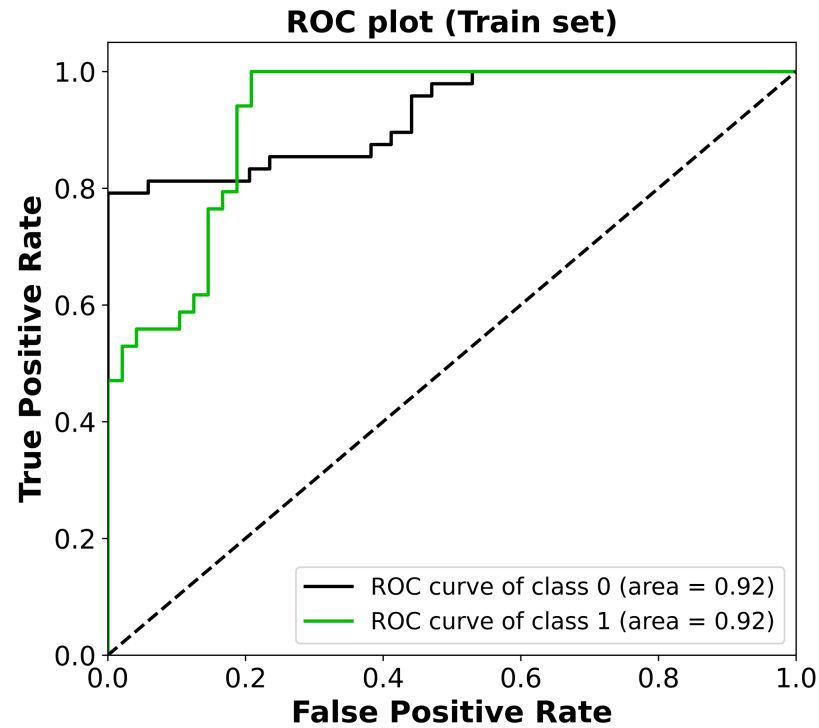
Iron



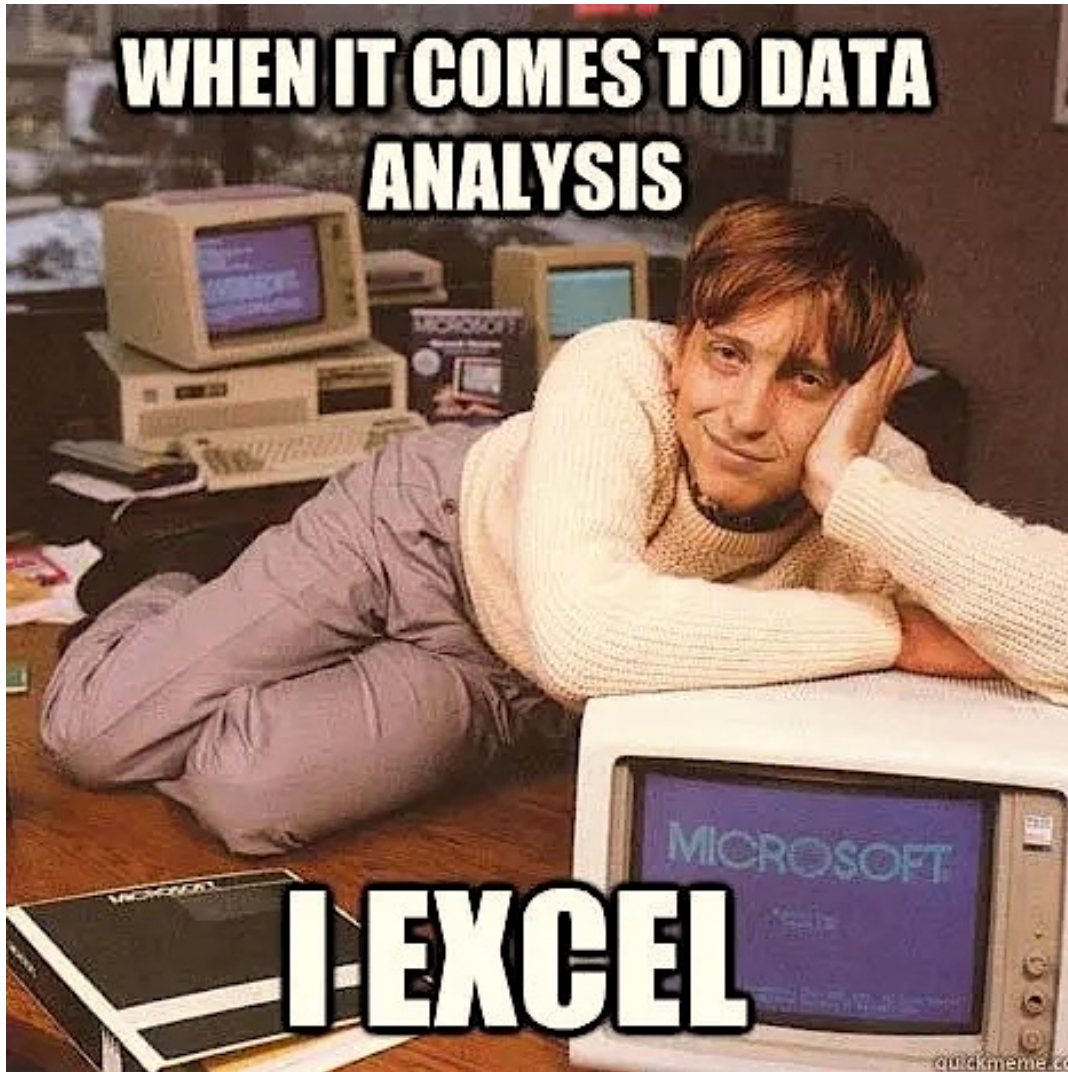
Chloride



Accuracy



Where to get started!? Start in Microsoft Excel.



<https://datasciencedojo.com/blog/data-science-memes/>

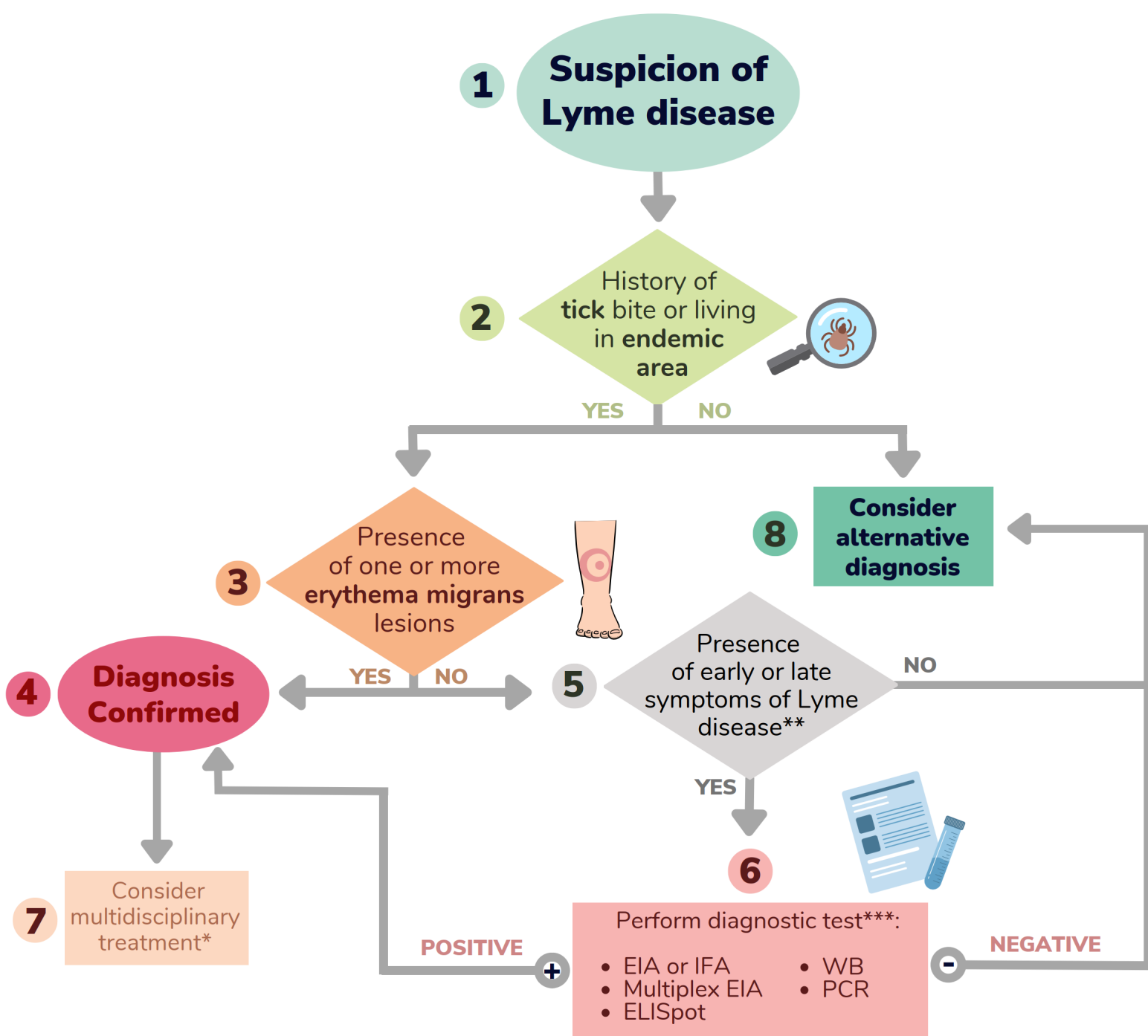
	Parameter 1	Parameter 2n
Patient 1			
Patient 2			
Patient 3			
Patient 4			
Patient 5			
6			
7			
8			
n			

Automated data collection is possible from **standardized** PDF or excel

Clinical Algorithm and Diagnostic Tools for Lyme Disease



Clinical Algorithm and Diagnostic Tools for Lyme Disease



Take home messages...

1. **Clinical background must state out diagnosis.**
2. **Diagnostic tests support the diagnosis of Lyme disease, not establish it.**
3. **Patients with Lyme disease should be assessed by a multidisciplinary approach.**



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Diagnosis and Treatment Strategies of Tick-borne Diseases

Edited by Leona Gilbert, John Shearer Lambert, Jinyu Shan, and Eva Sapi
Available in *Frontiers in Microbiology*, *Frontiers in Cellular and Infection
Microbiology*, *Frontiers in Public Health*, and *Frontiers in Medicine*

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