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Benchmarking Laboratory Quality

Zoe C. Brooks

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Update: January 2016.

This study was presented at a Total Quality Management Symposium in Toronto in 2001. Nobody noticed.

The issues highlighted here persist today. Risk Management concepts and software remove the complexity of all these statistics and present the same knowledge in a format that is easy to understand.

Maybe now someone will notice. Zoe C. Brooks

(It has not been published prior to posting at ResearchGate January 2016.)

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Many thanks are extended to the participating laboratories:

Lab Name	City	Province/State
Cape Breton Healthcare Complex	Sydney	NS
Children's Memorial Hospital, Chicago	Chicago	IL
Gamma-Dynacare Brantford	Brantford	ON
Gamma-Dynacare London	London	ON
Gamma-Dynacare Ottawa	Ottawa	ON
Hamilton Health Sciences: Henderson Campus	Hamilton	ON
Joseph Brant Memorial Hospital	Burlington	ON
Kaiser Permanente Regional Lab	Berkley	CA
Laboratorio Analisi Chimico Cliniche- Azienda Ospedale Careggi	Firenze	Italy
London Health Services Centre (Westminster Campus)	London	ON
London Health Services Centre (University Campus)	London	ON
London Health Services Centre (Victoria Campus South Street)	London	ON
MDS Laboratories	Sudbury	ON
Phenix Regional Hospital	Phenix City	AB
St Paul's General Hospital	Vancouver	BC
Swedish Covenant, Chicago	Chicago	IL
The Hospital for Sick Children	Toronto	ON
Tillsonburg District Memorial Hospital	Tillsonburg	ON
Toronto East General Hospital	Toronto	ON
Toronto Medical Labs	Toronto	ON
Whitehorse General Hospital	Whitehorse	YK

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**Many thanks are extended
to the control laboratories**

These laboratories have applied the “Performance-Driven Quality Control” process for two to ten years.

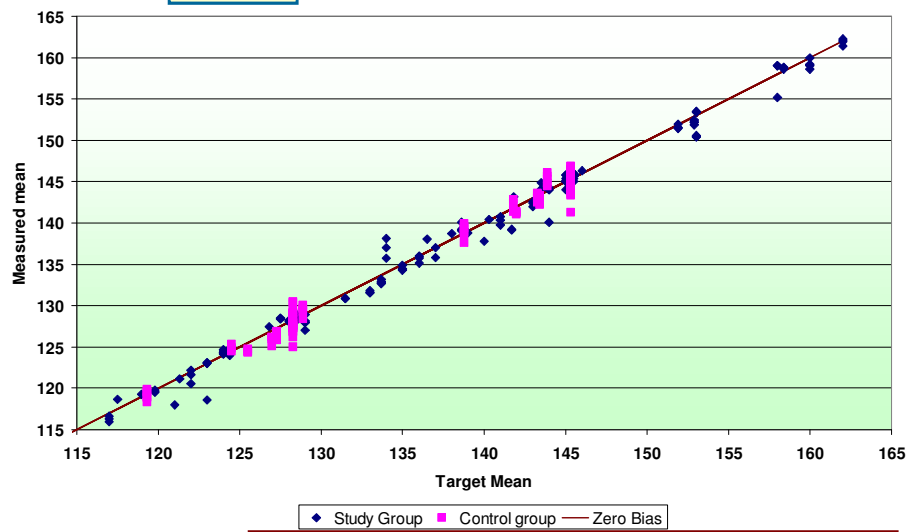
Ansen General Hospital	Iroquois Falls	ON
Bingham Memorial Hospital	Mattheson	ON
Hornepayne Community Hospital	Hornepayne	ON
Lady Minto Hospital	Cochrane	ON
Notre Dame Hospital	Hearst	ON
Sensenbrenner Hospital	Sensenbrenner Hospital	ON
Smooth Rock Falls Hospital	Smooth Rock Falls	ON
Fort MacLeod Hospital	Fort MacLeod	AB
Pincher Creek Hospital	Pincher Creek	AB
Taber Hospital	Taber	AB
Crowsnest Pass Hospital	Blairmore	AB
Cardston Hospital	Cardston	AB
Lethbridge Regional Hospital	Lethbridge	AB

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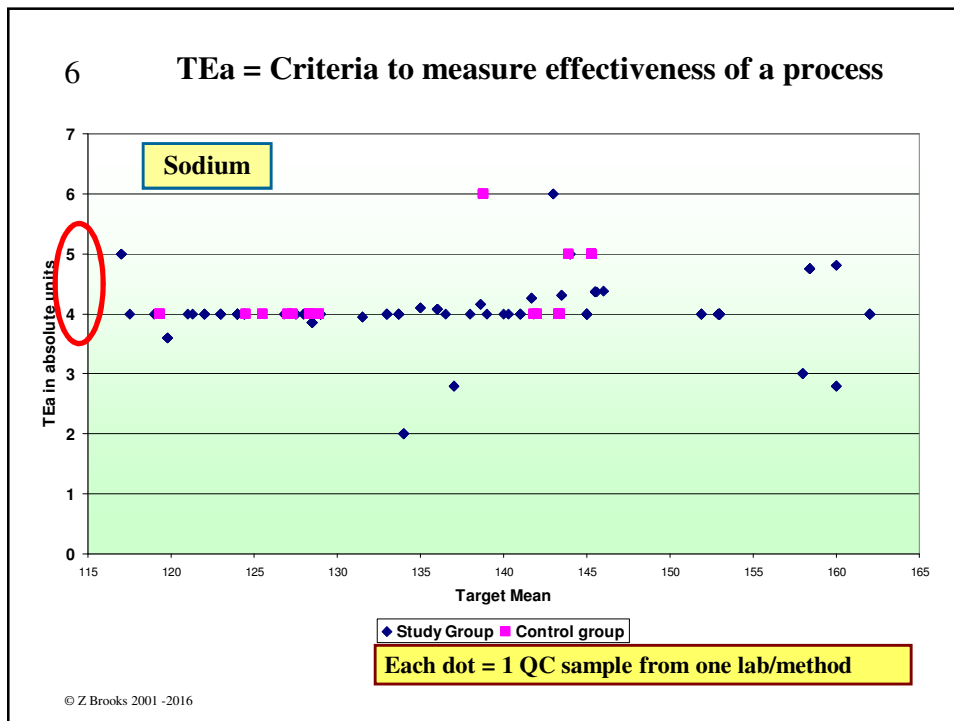
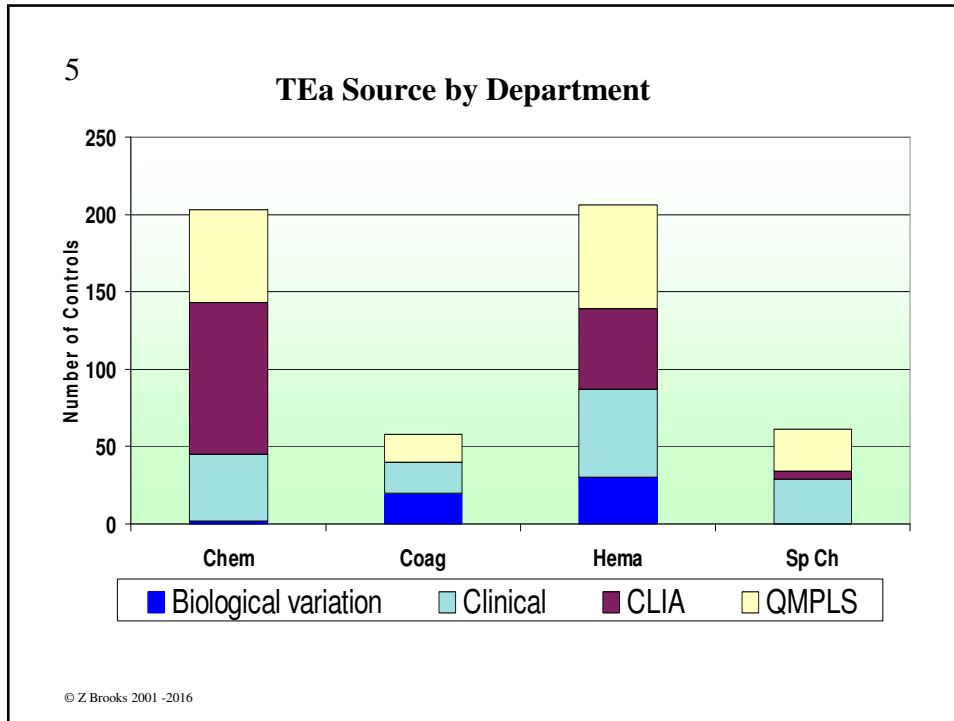
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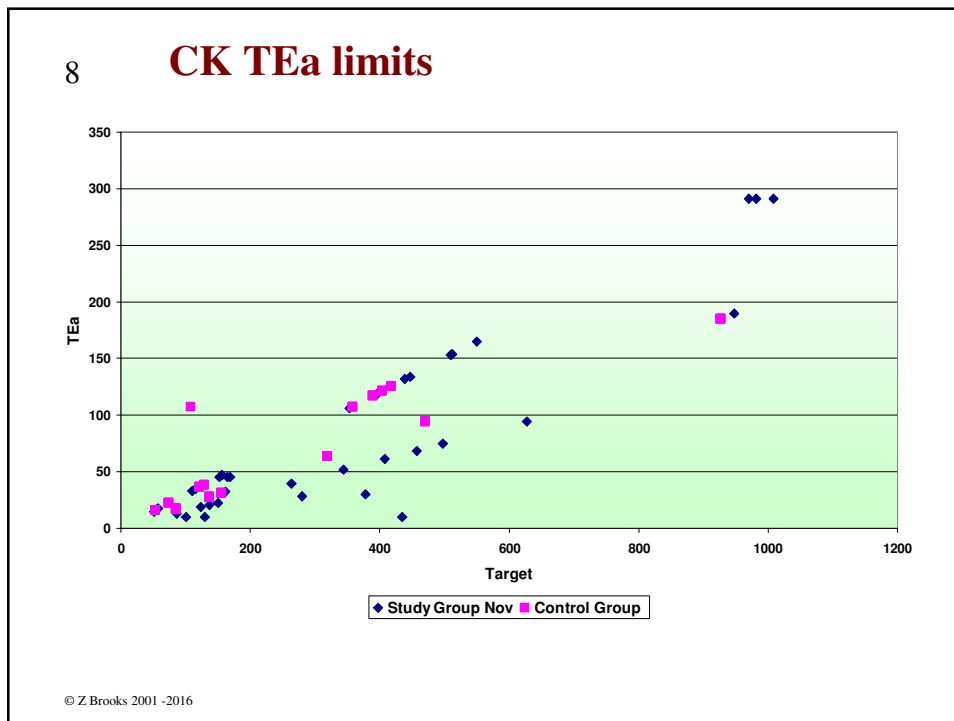
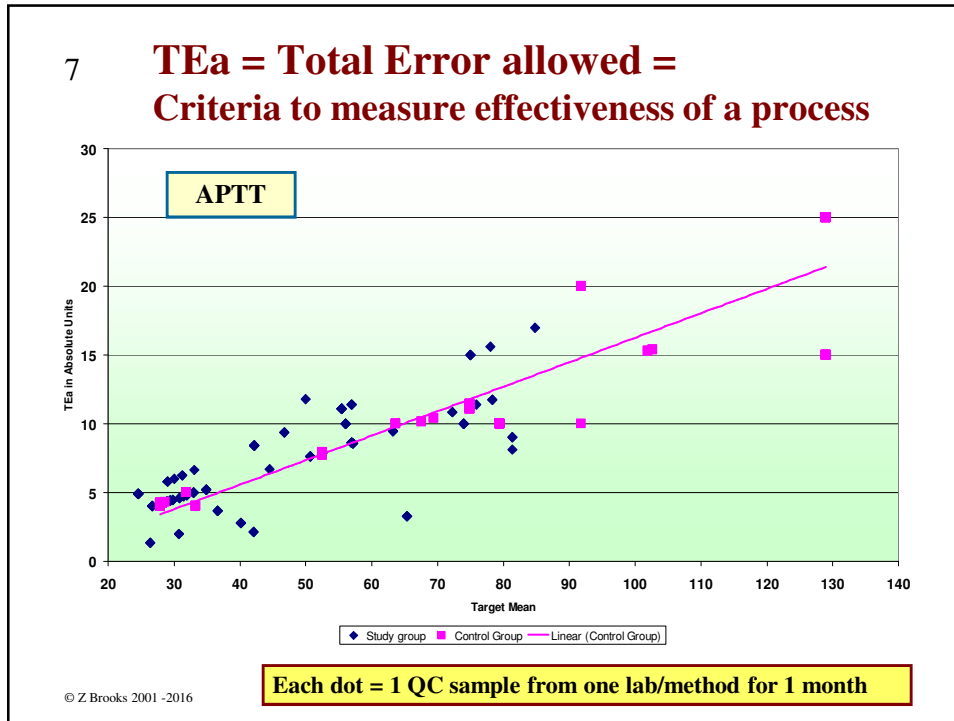
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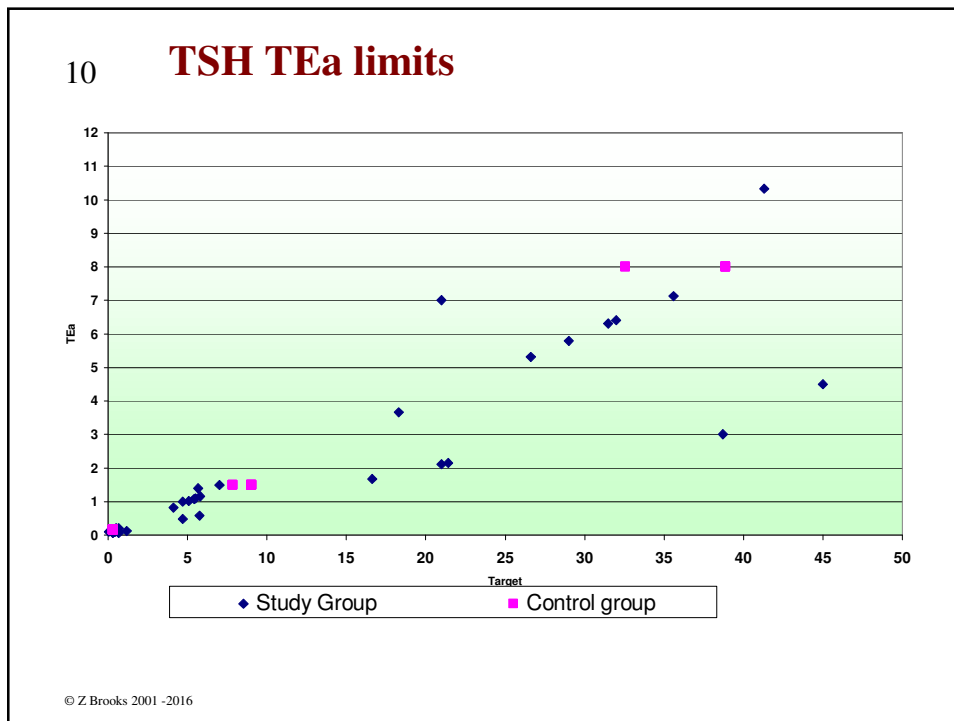
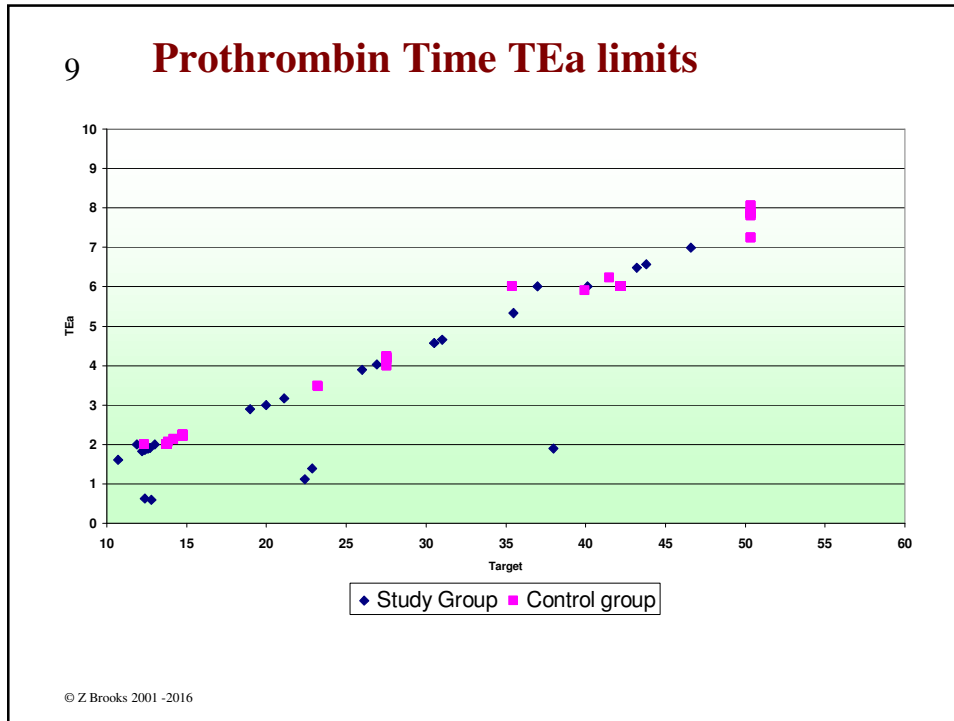
Sodium

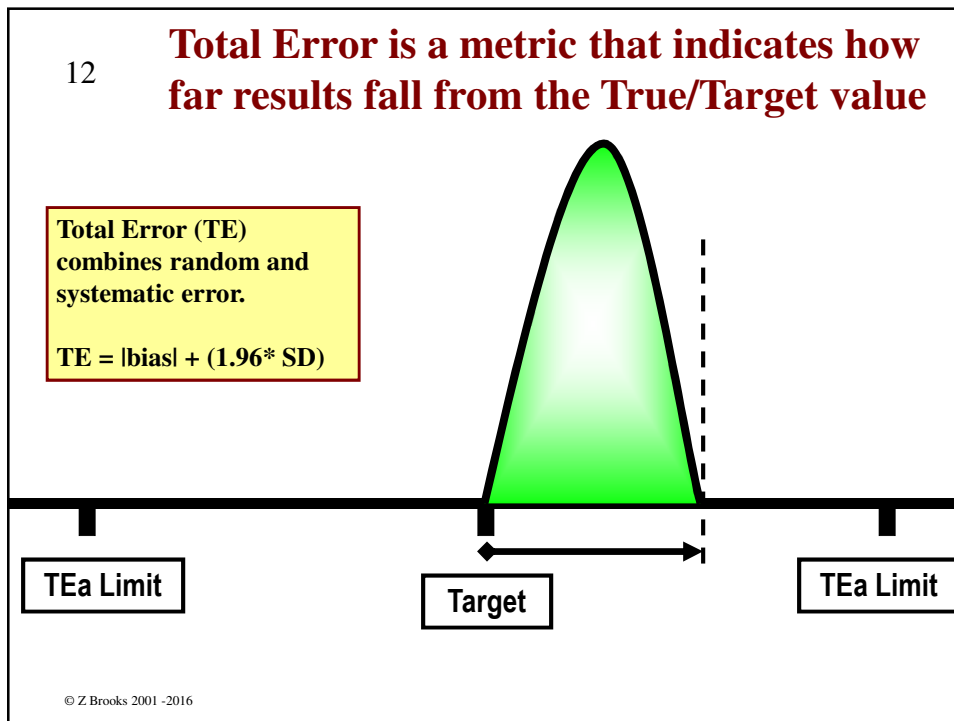
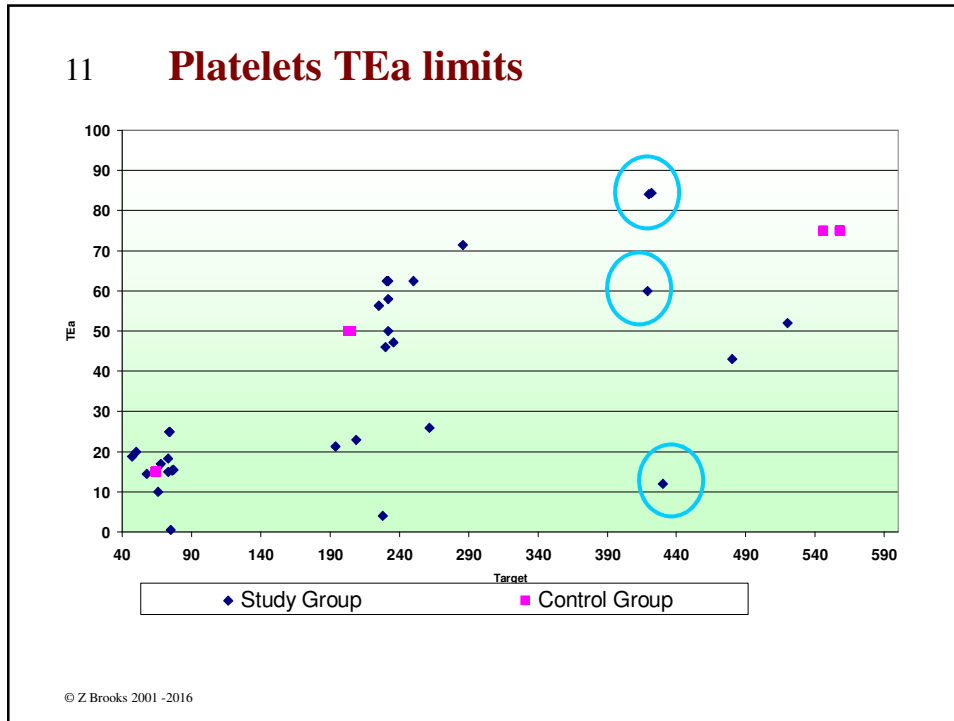


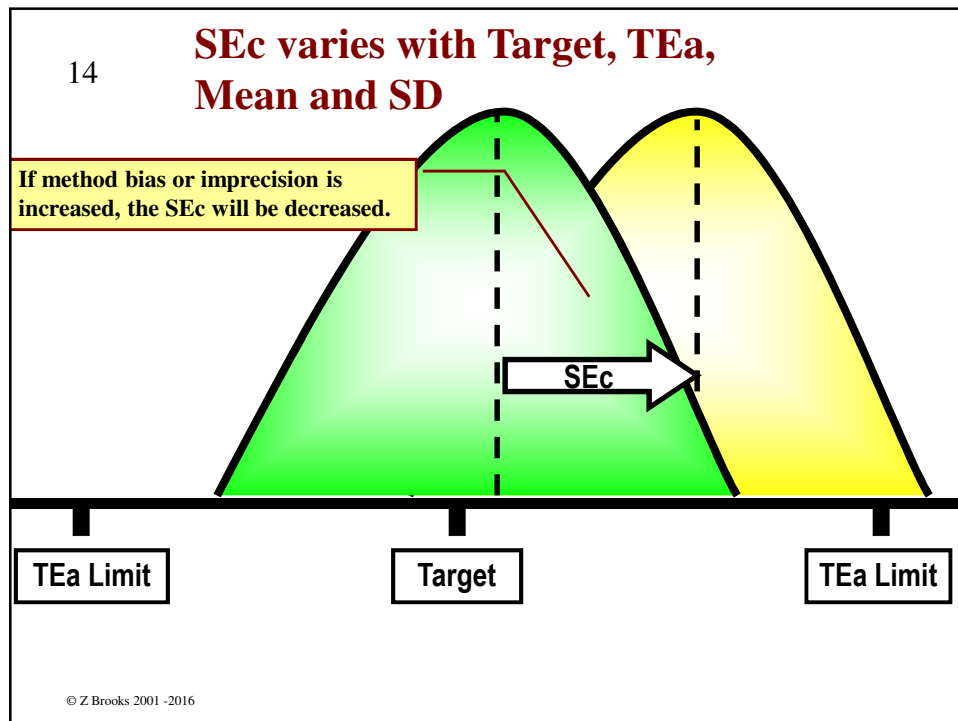
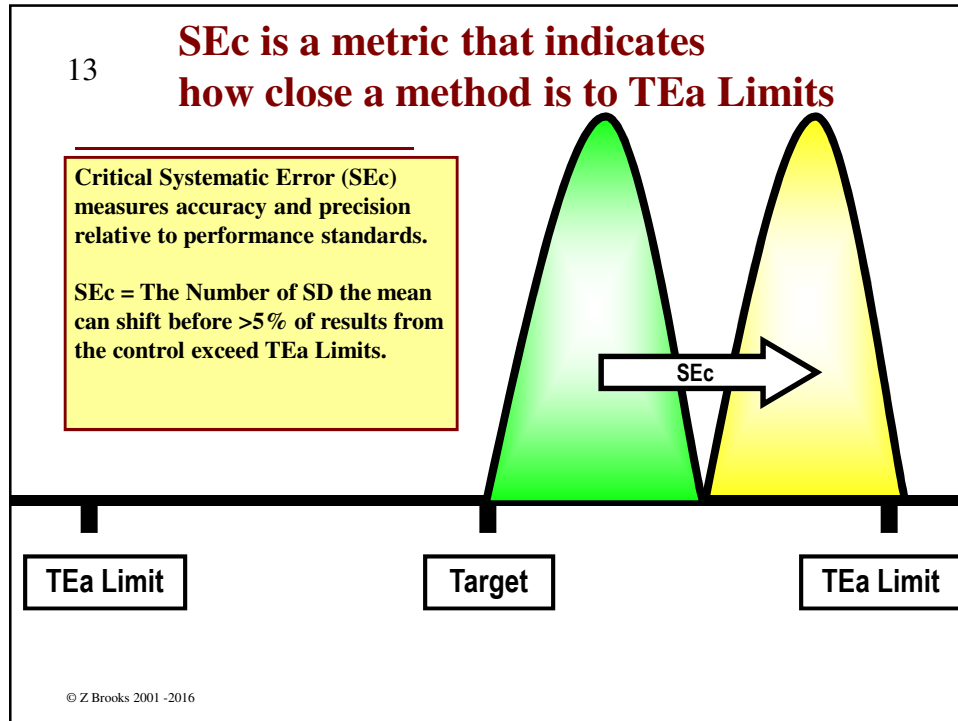
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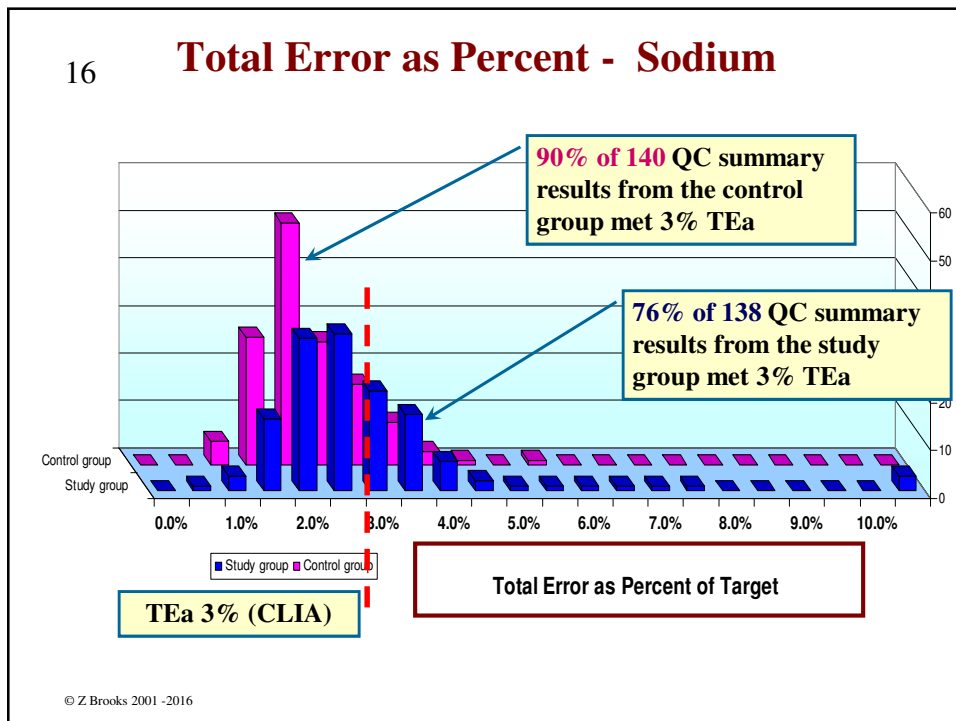
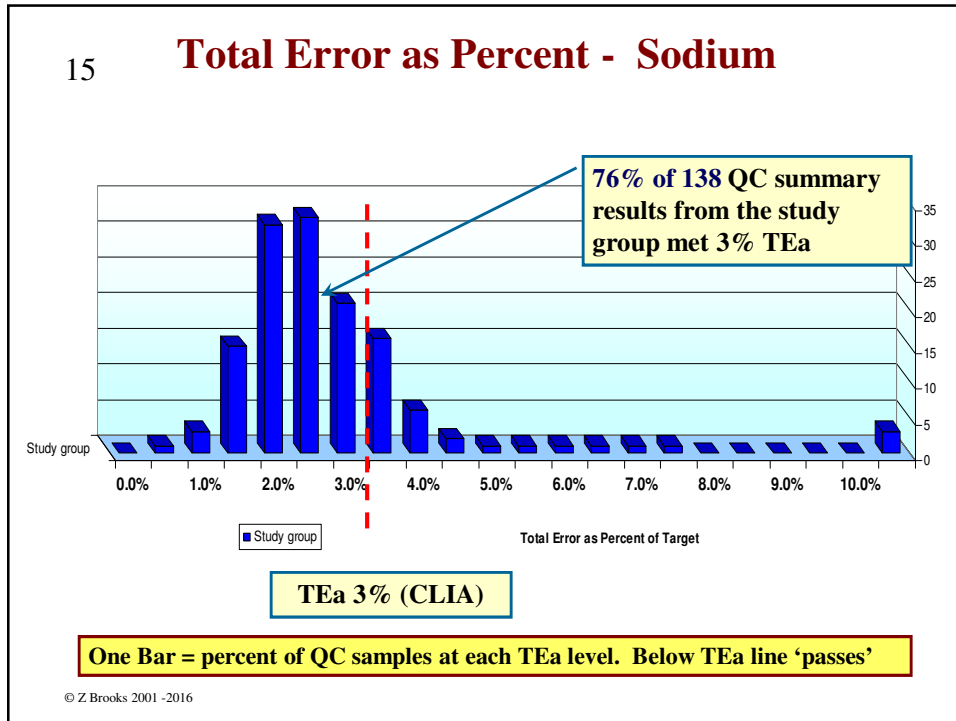


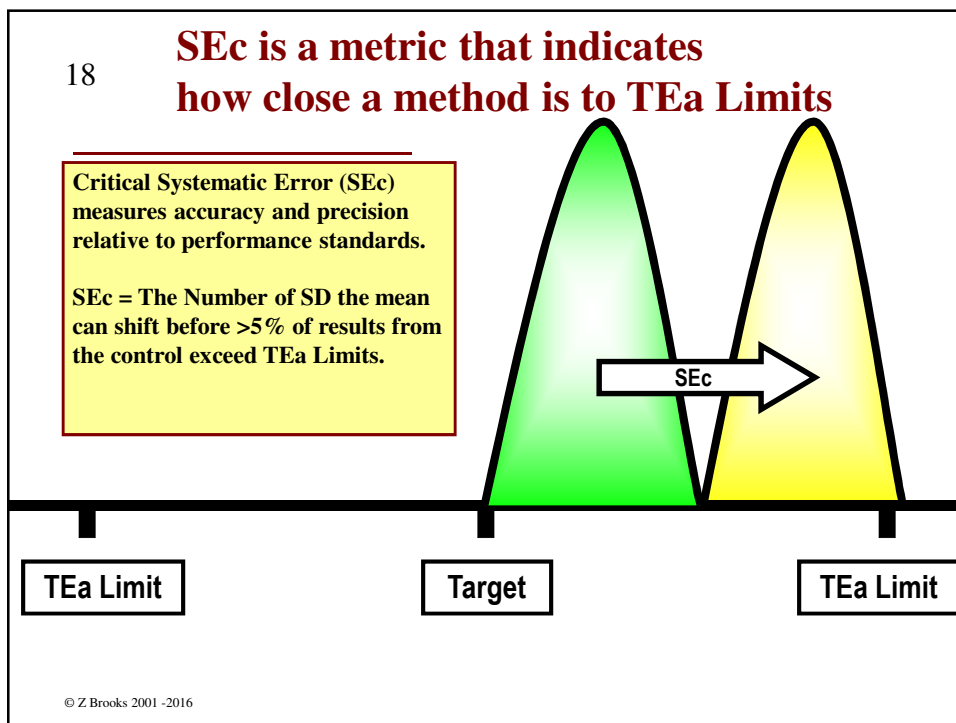
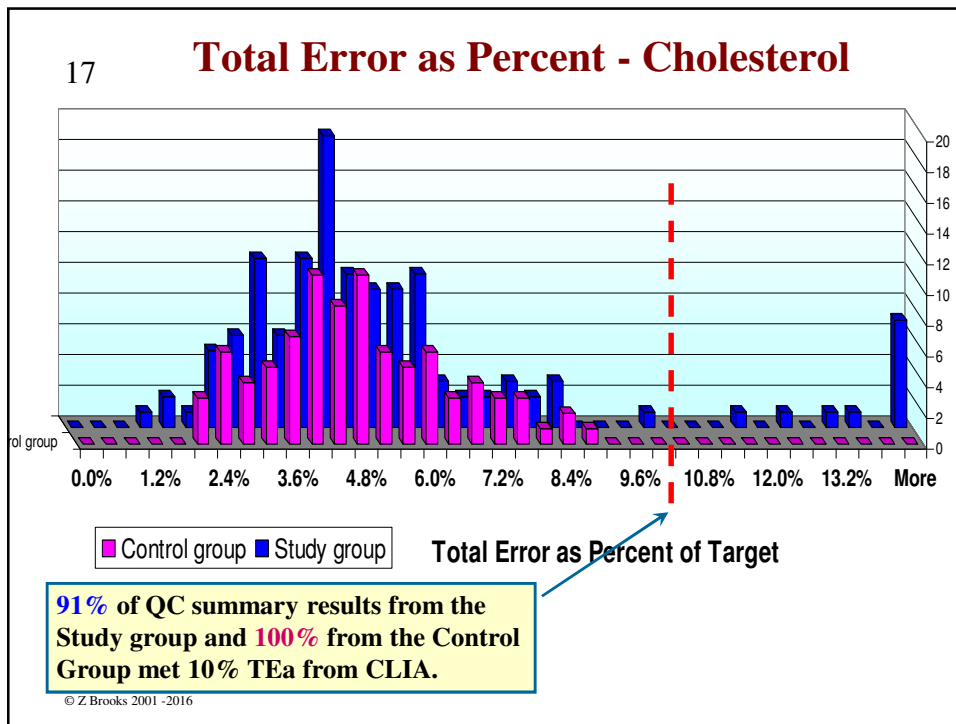


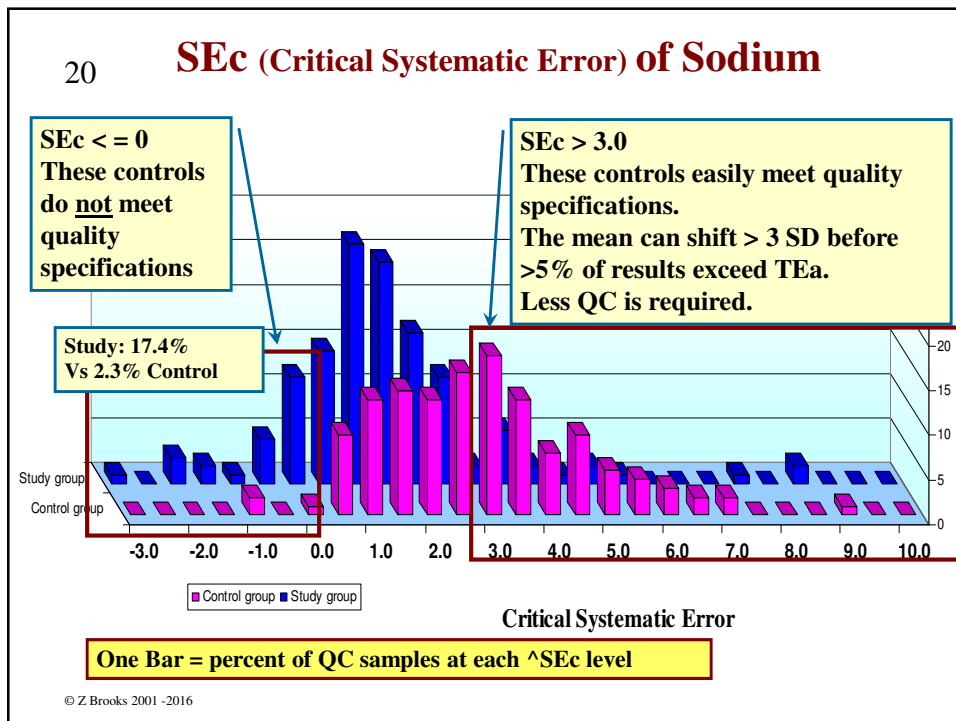
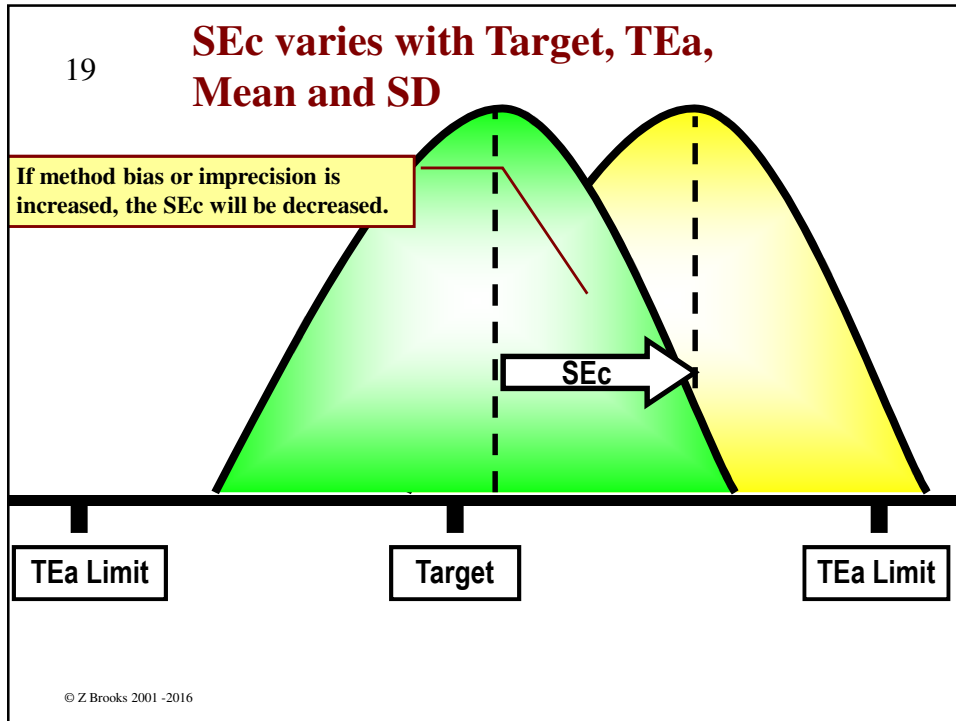


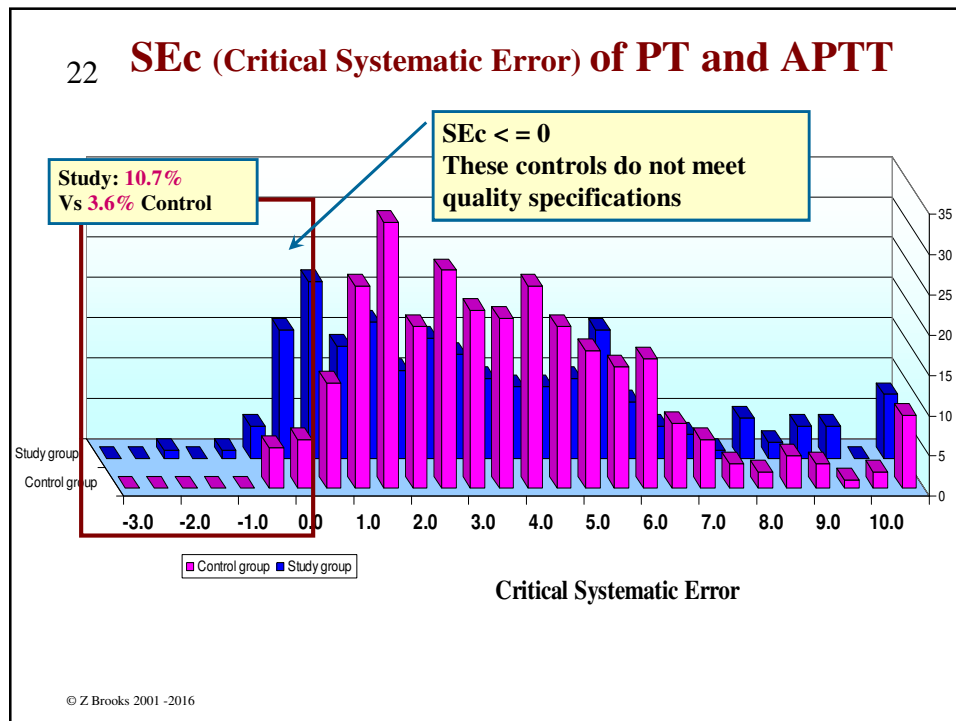
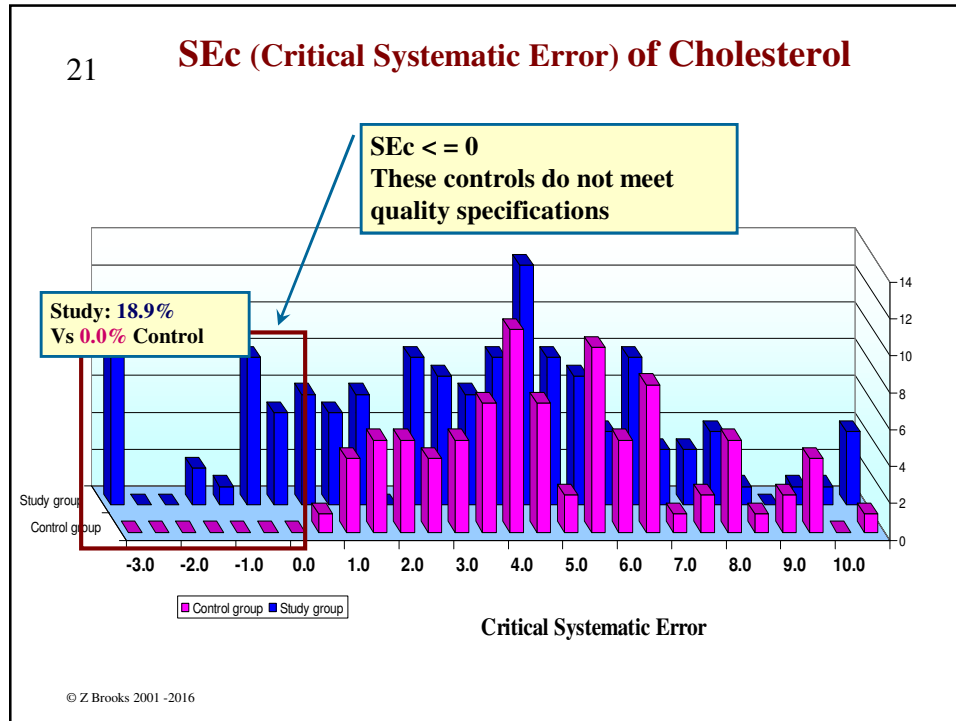


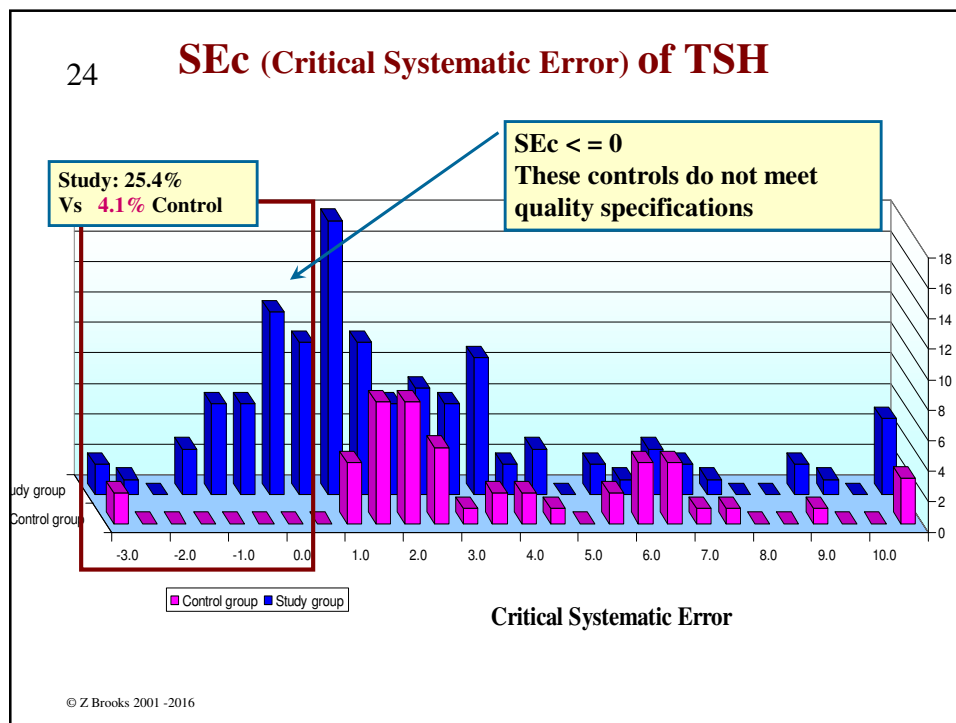
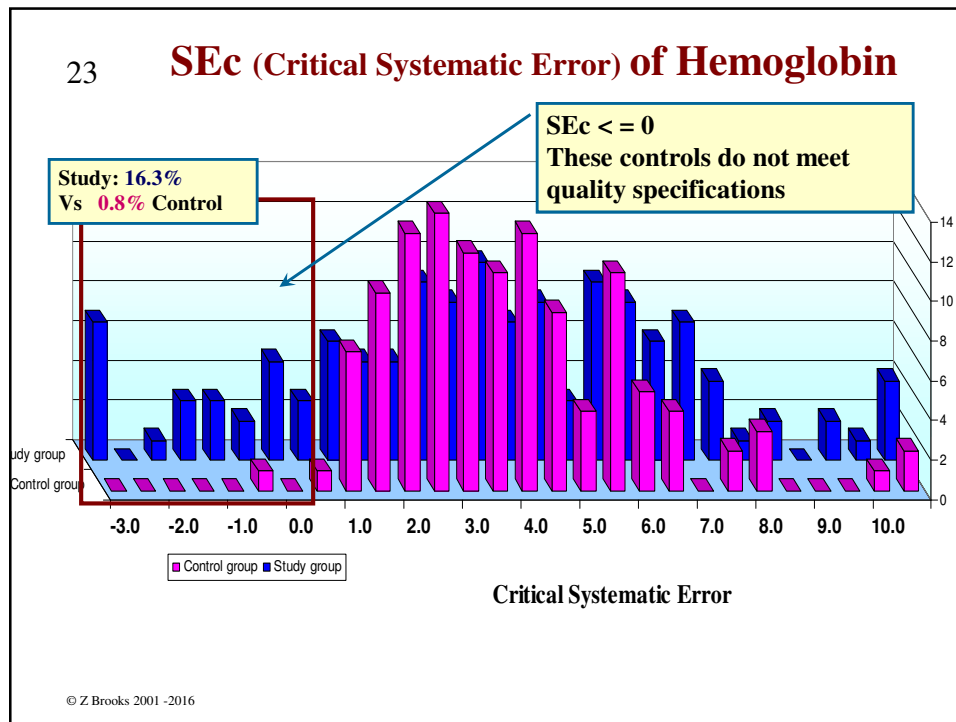


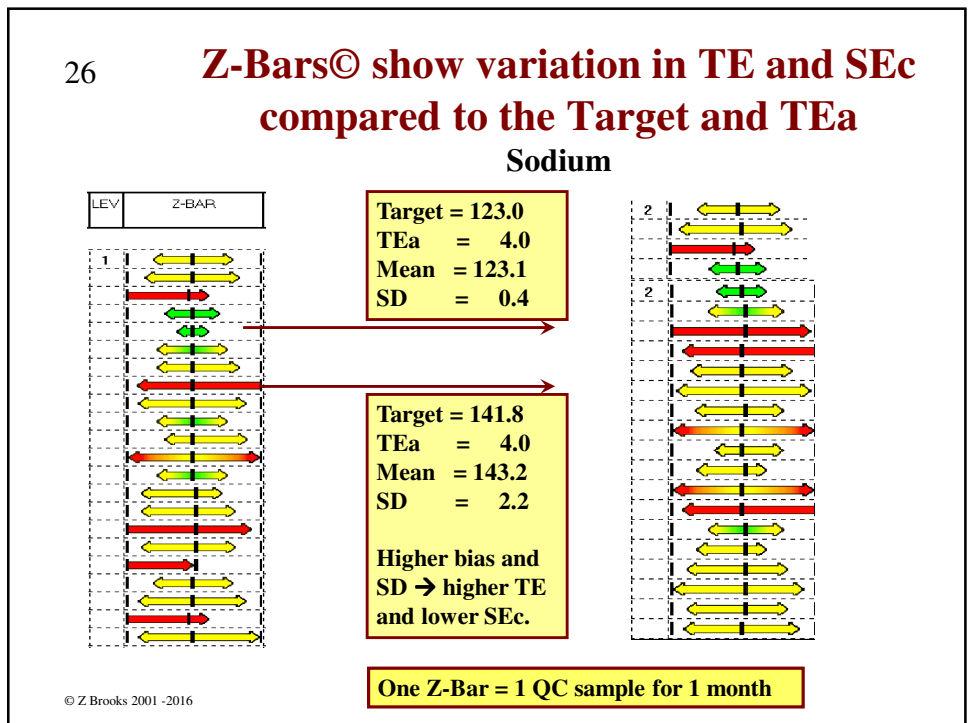
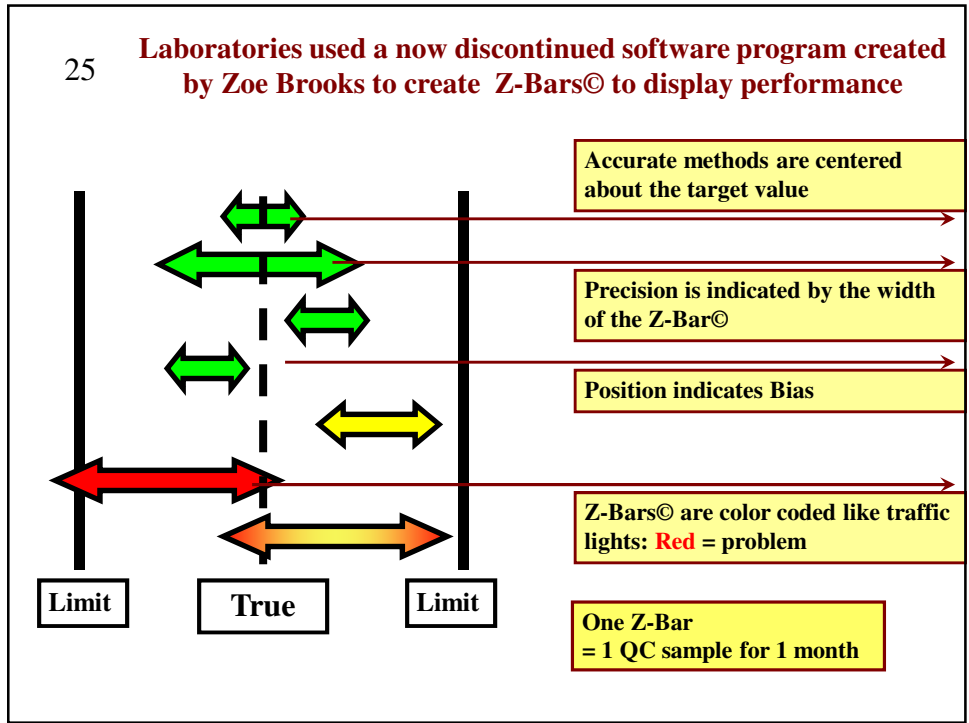








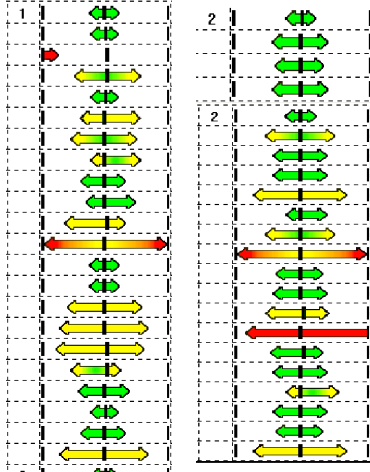




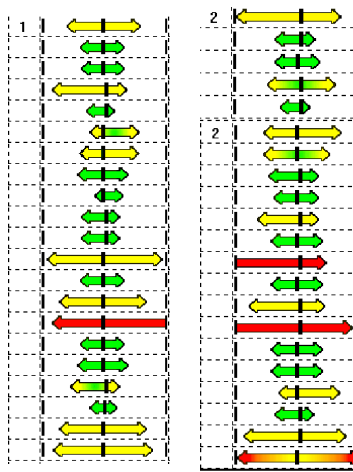
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Potassium



Calcium

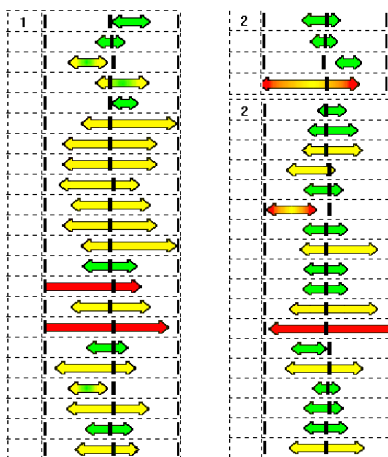


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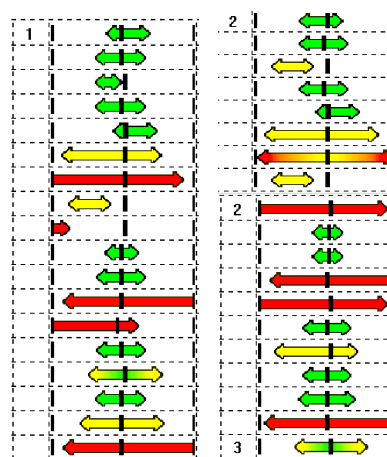
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Glucose



Cholesterol

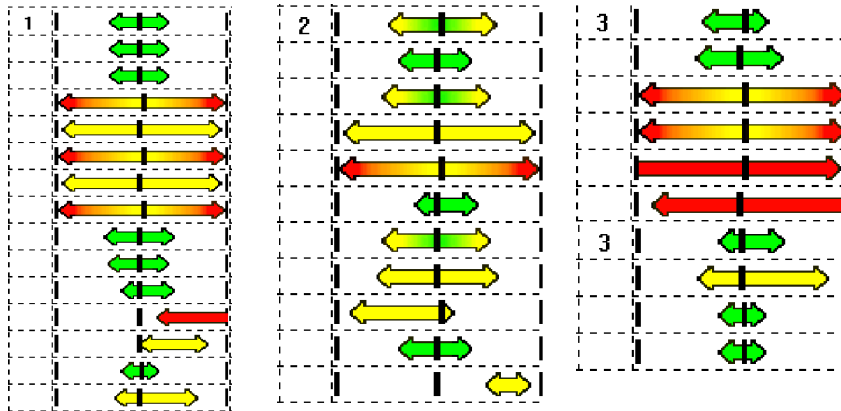


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APTT

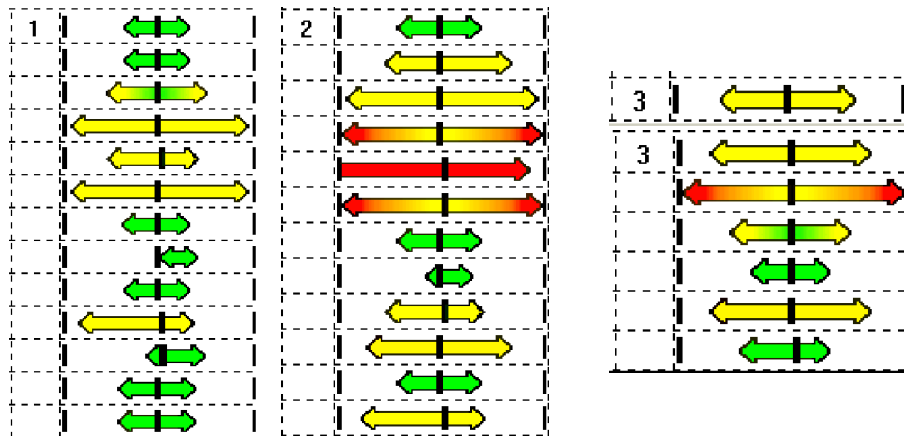


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Prothrombin Time

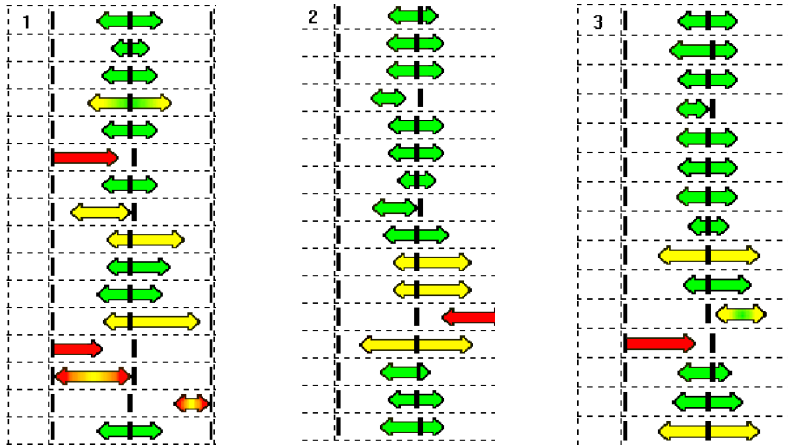


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Hemoglobin

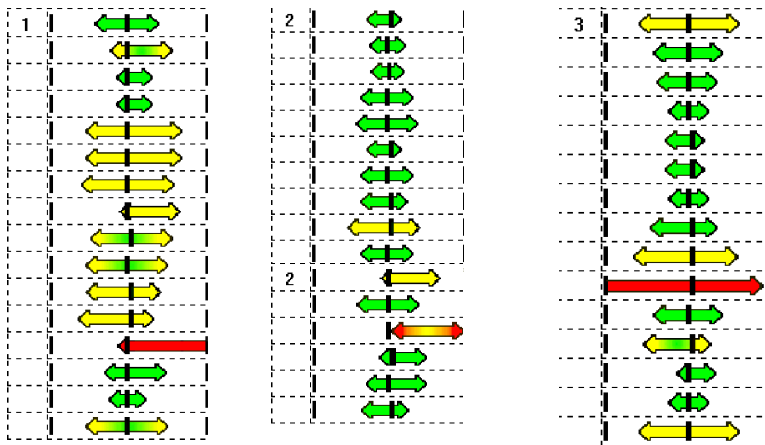


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WBC

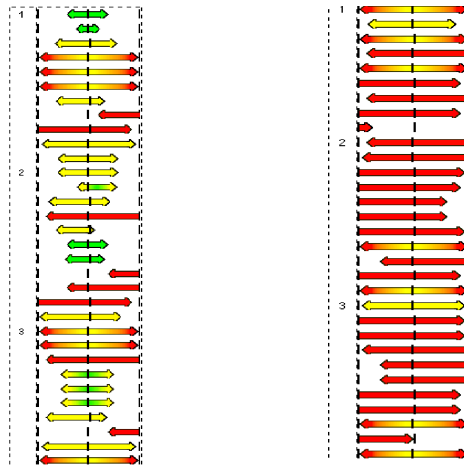


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Eosinophil Absolute Count and Percentage

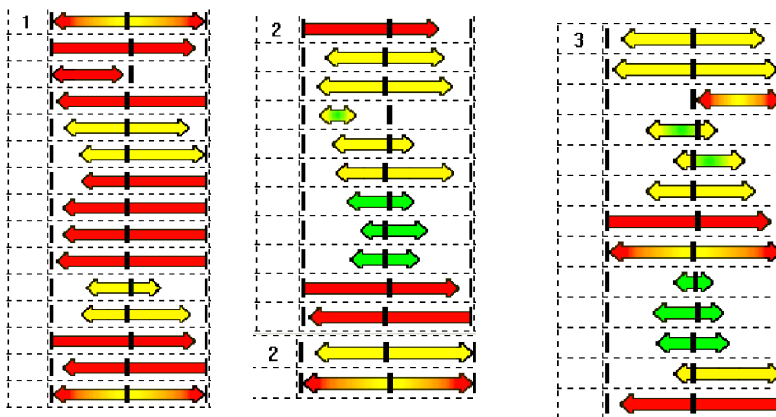


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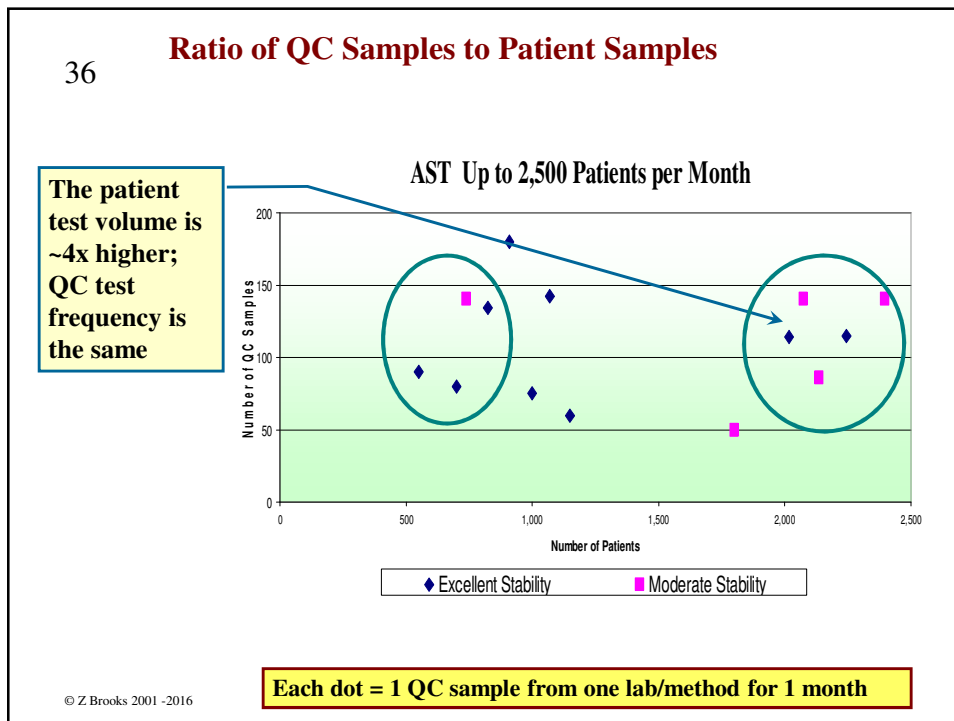
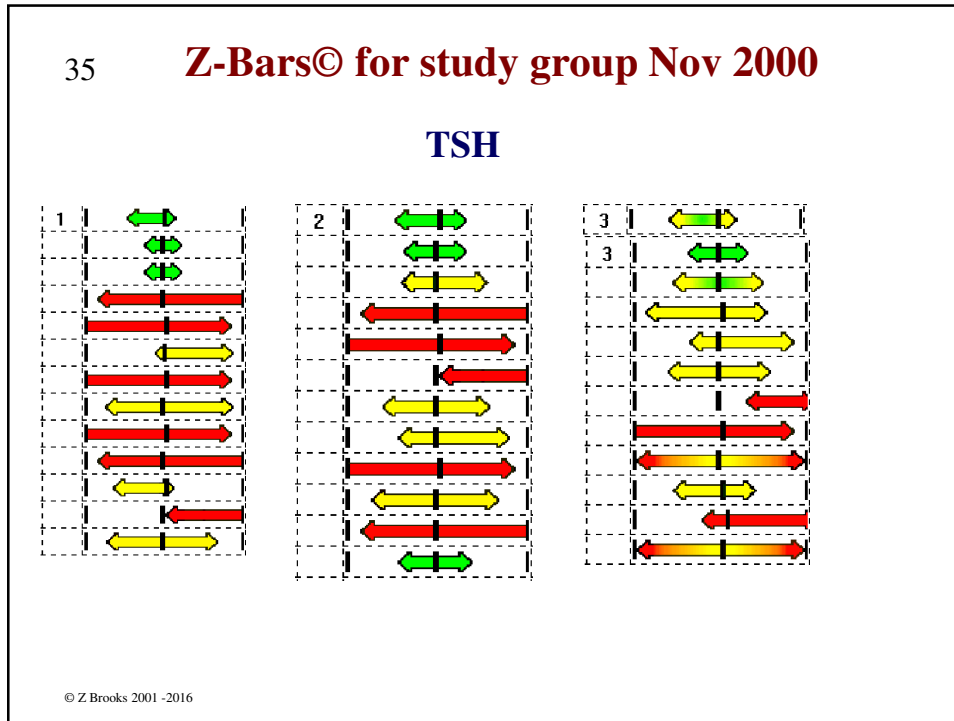
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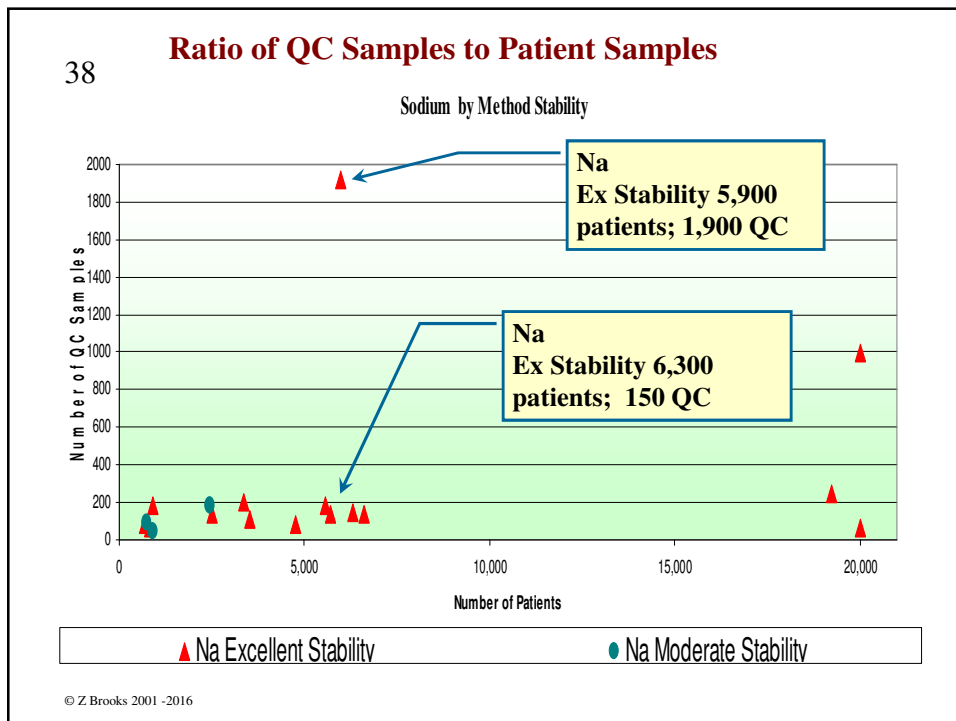
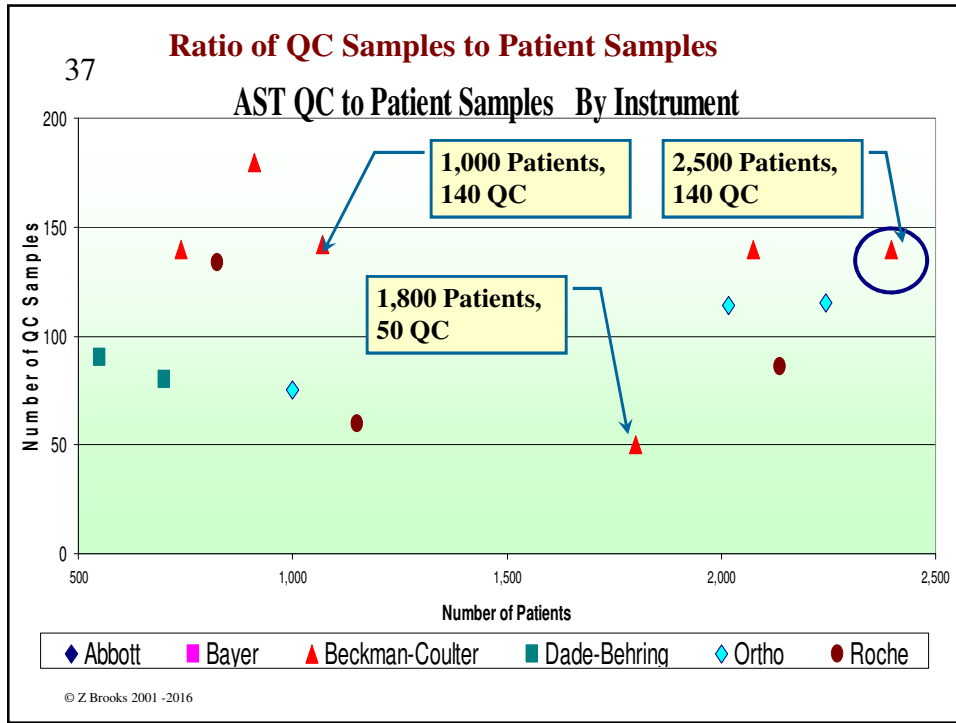
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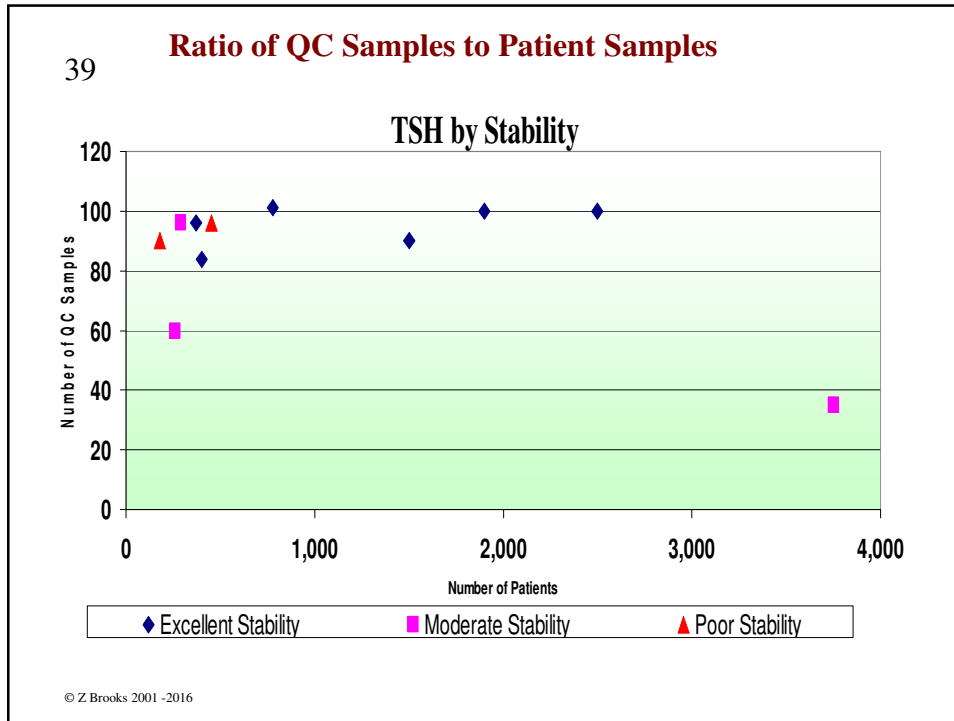
Digoxin



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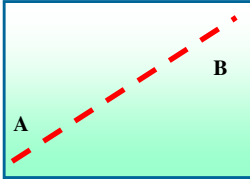


40 Does the observed SEc affect the selection of QC rules?

We can increase error detection when SEc is low by increasing the number of QC samples or frequency of QC runs.

Thus we would expect that the ratio of patient samples to QC samples would be **INVERSELY** proportional to SEc.

A control that can only shift 1 SD (A) requires more frequent QC than one that can shift 10 SD before exceeding quality specifications. (B)

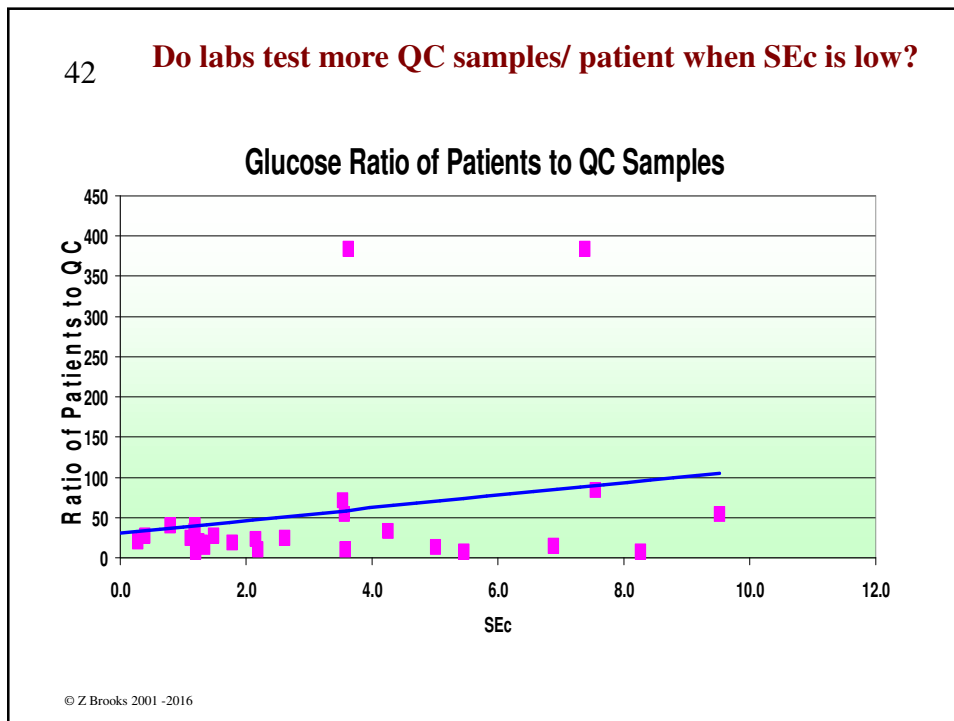
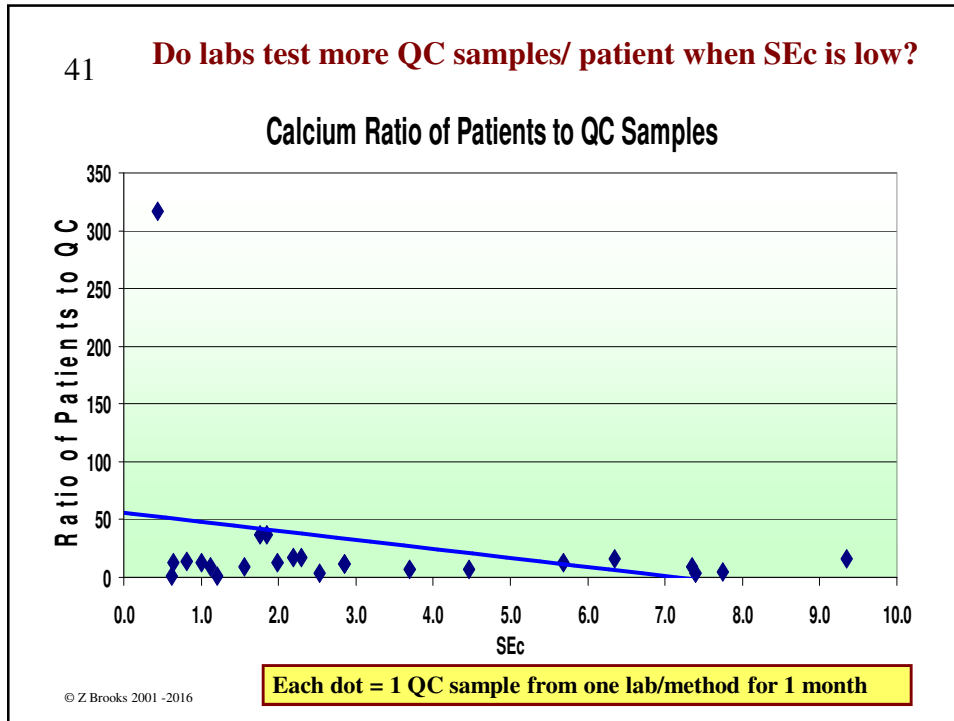


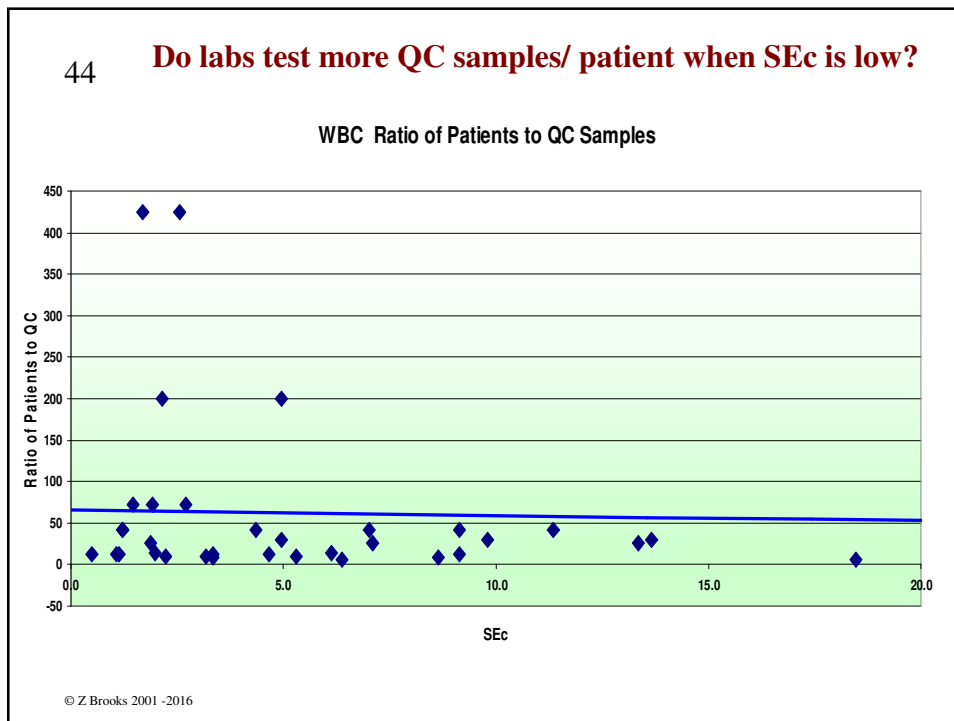
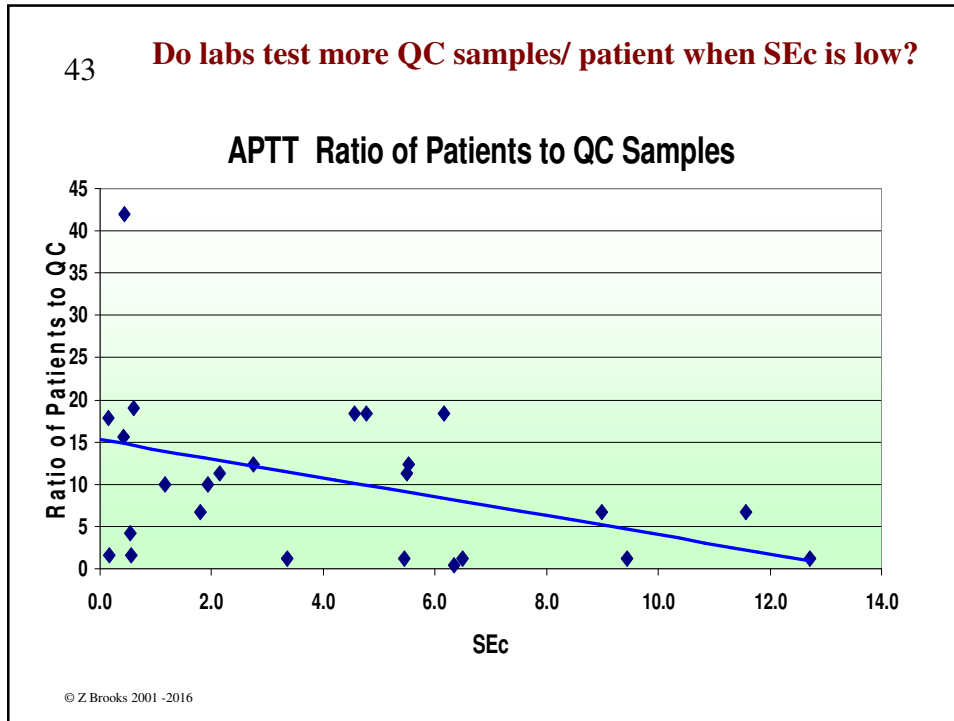
SEc zero to > 10

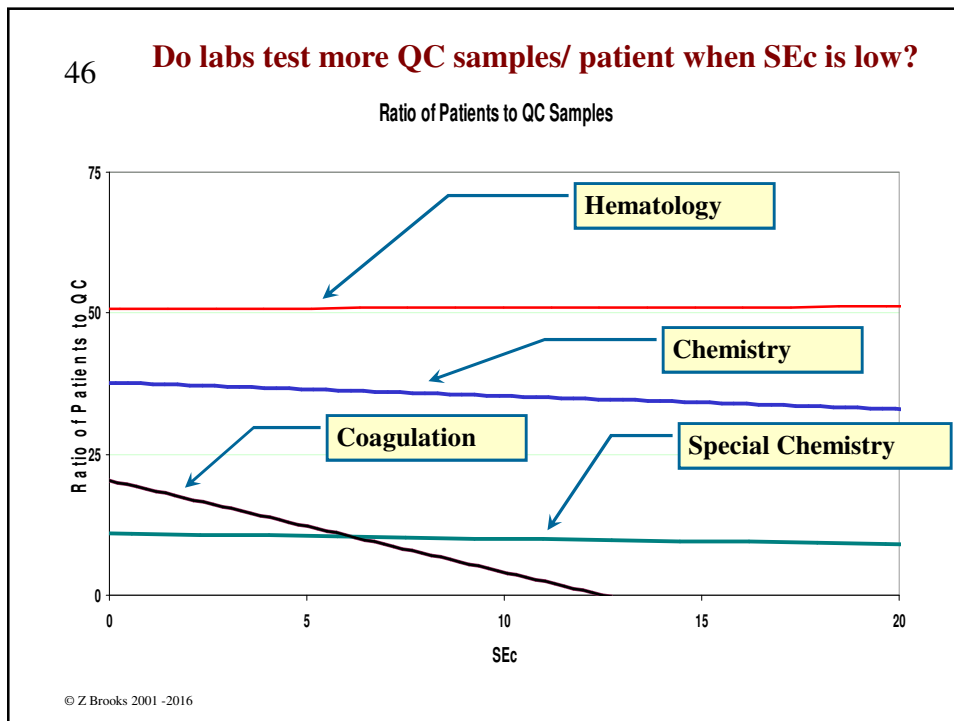
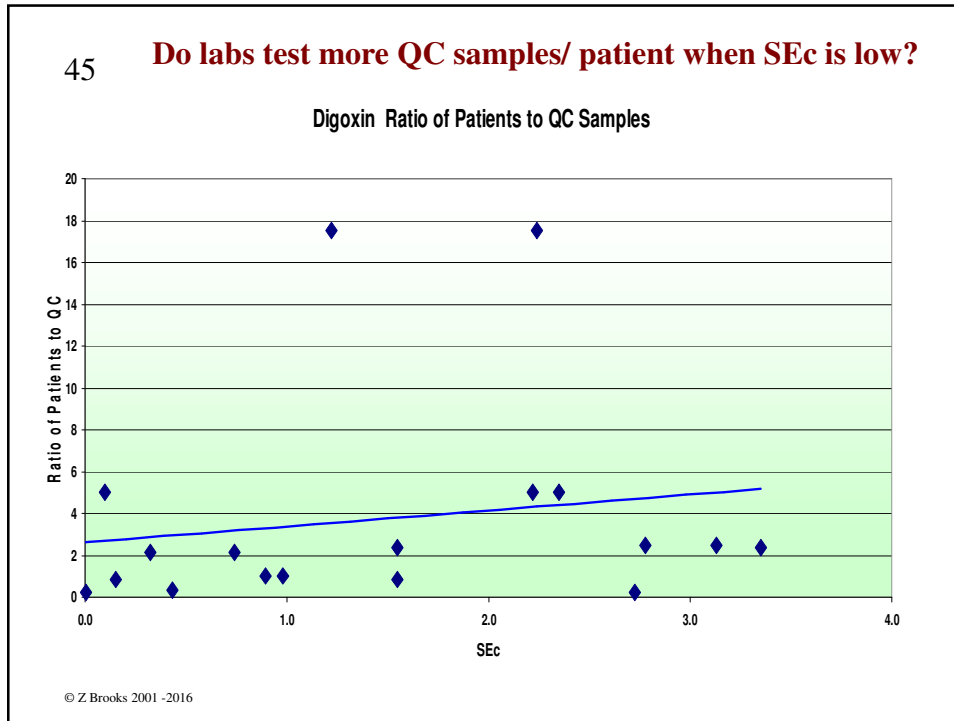
A = 10 pts/QC

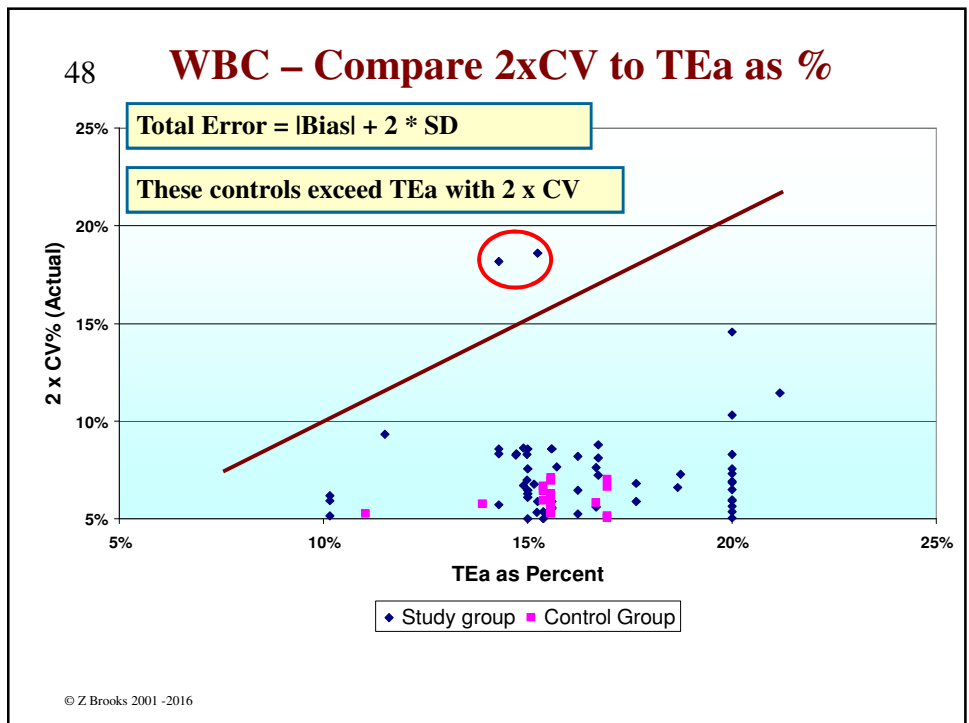
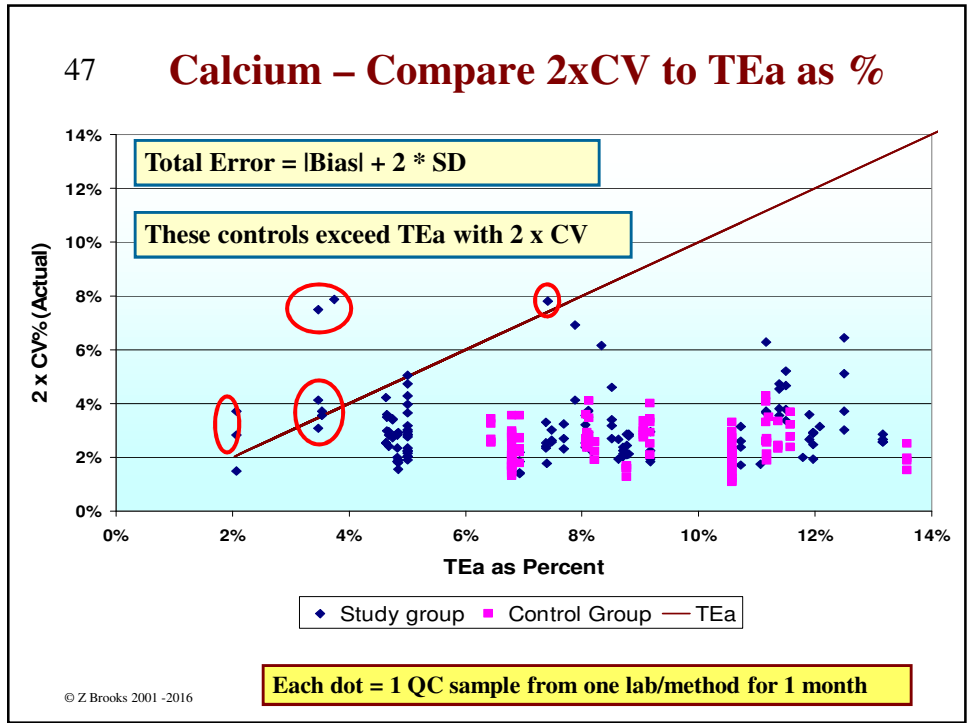
B = 100 pts/QC

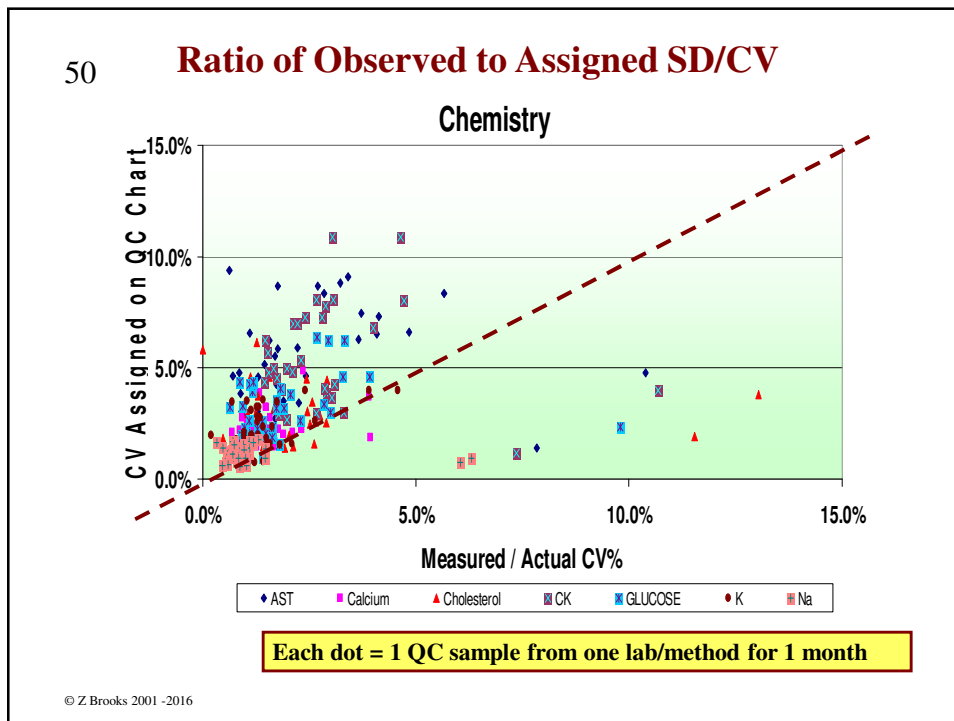
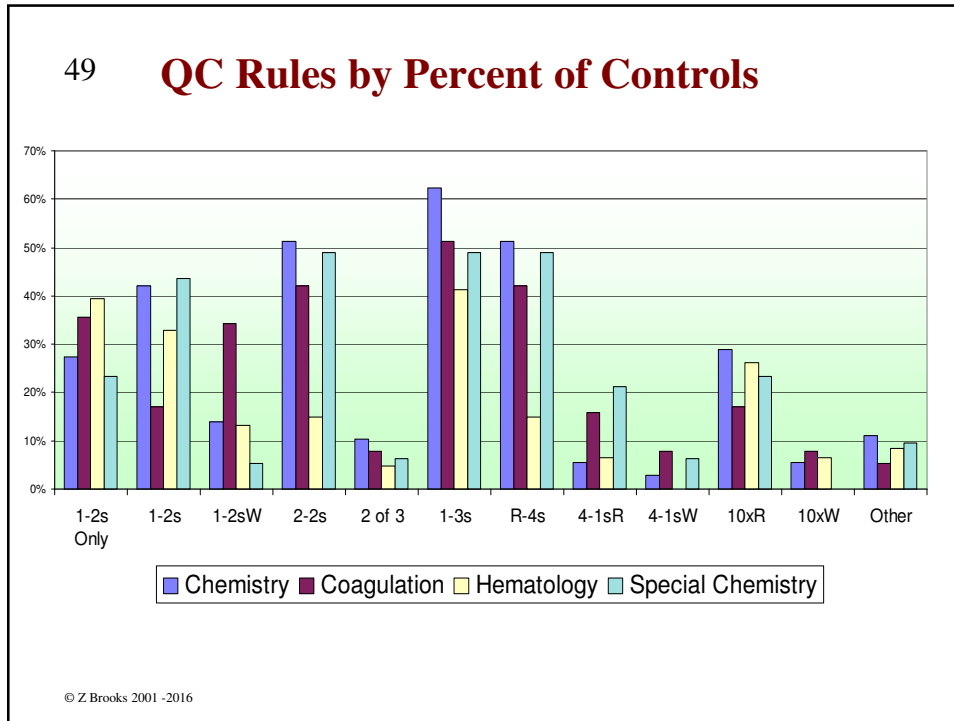
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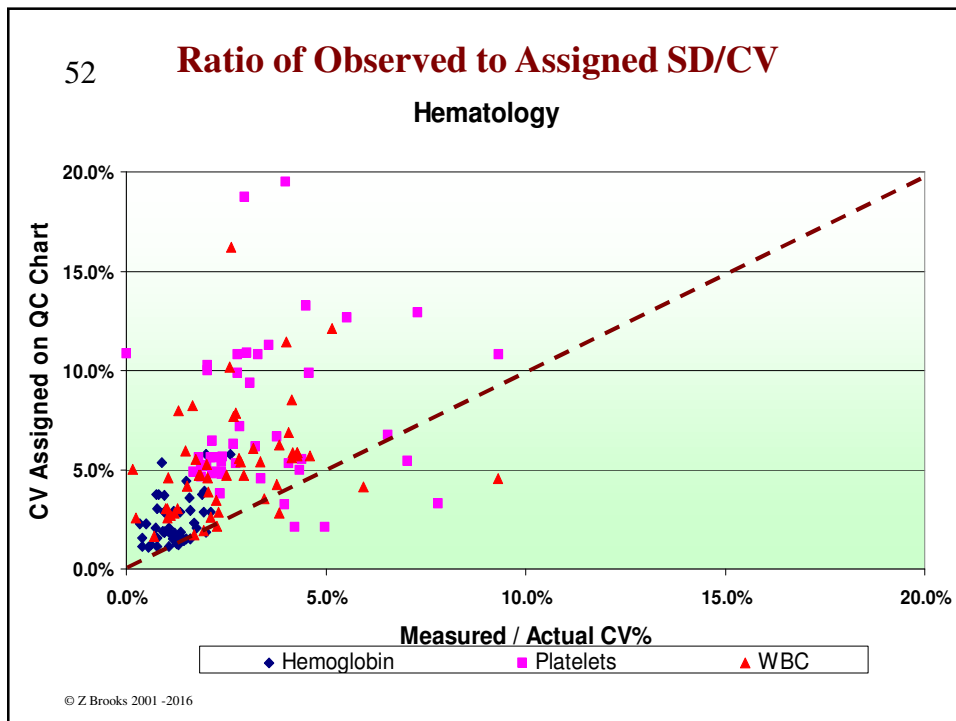
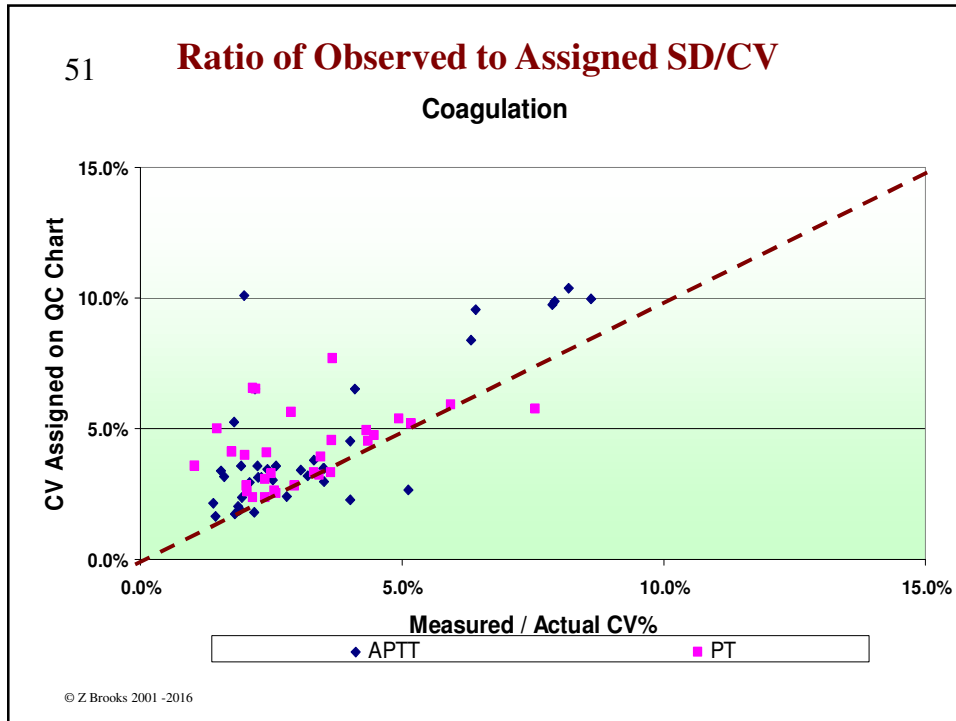


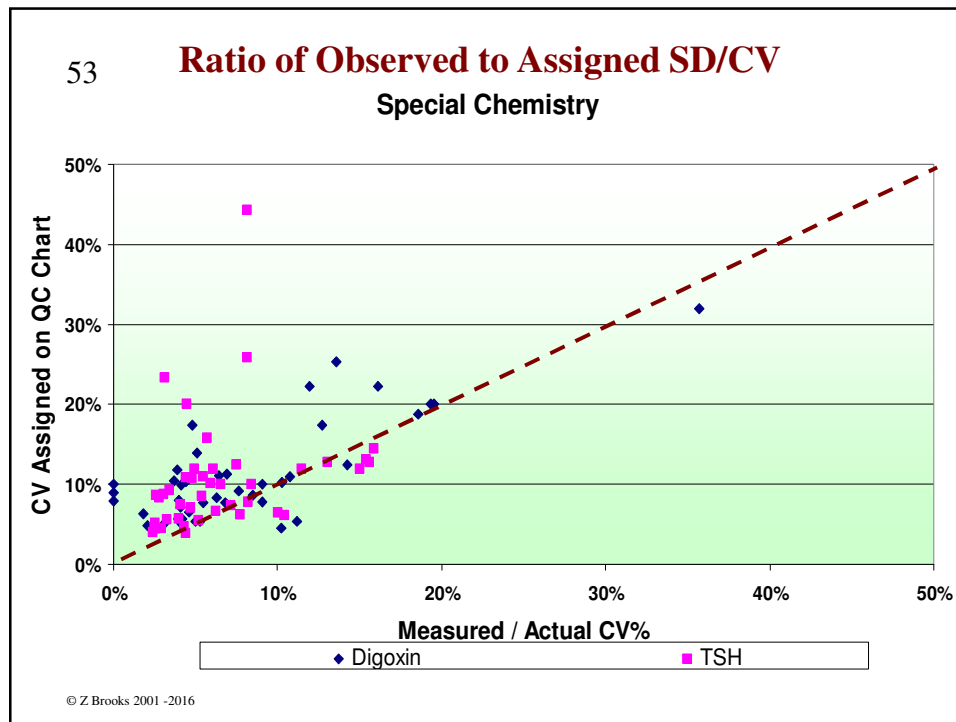












54 Comments January 16, 2016

This body of knowledge existed 10 years ago. Little (if any) improvement has been made in the effectiveness of quality control processes or, surprisingly, in the risk levels of medically-unreliable results.

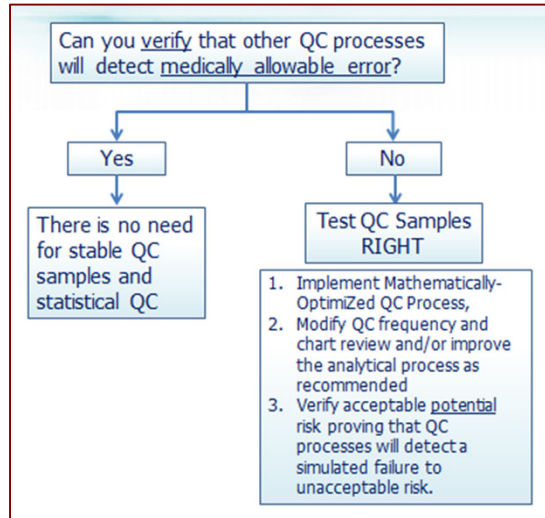
Risk Metrics, Risk Graphics and the process of Mathematically-Optimized Risk Evaluation (M.O.R.E.) transform this overwhelming amount of data into meaningful information with recommendations. This new perspective creates a new paradigm in quality management.

S.Q.C.	M.O.R.E.
A calculation	A process
4 variables	11 Risk Drivers
Creates a metric - sigma (replaced \hat{SEc}) <i>\hat{SEc} is a far better metric for labs. Margin for Error is better than both.</i>	Manages Risk 34 Risk Metrics 5 Benefits 14 Clear text evaluations 15 Recommendations

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Mathematically-OptimZed Risk Evolution virtually automates – and verifies- the QC process.



Please join me to explore this new paradigm.

zoe@awesome-numbers.org

www.awesome-numbers.org



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