Use of measures for Quality Improvement

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XKCD

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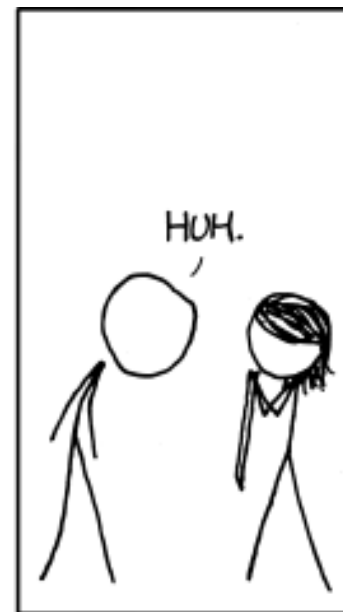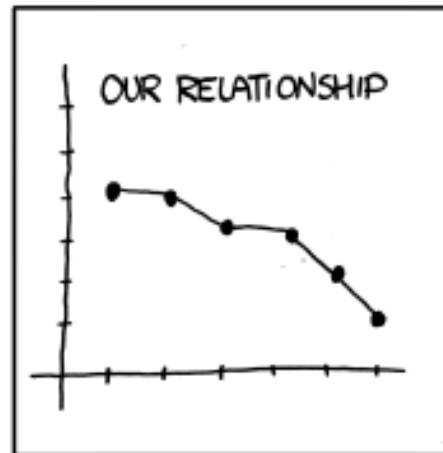
Aspect	Improvement	Accountability	Research
Aim	Improvement of care	Comparison, choice, reassurance, spur for change	New knowledge
Methods: • Test Observability	Test observable	No test, evaluate current performance	Test blinded or controlled
• Bias	Accept consistent bias	Measure and adjust to reduce bias	Design to eliminate bias
• Sample Size	"Just enough" data, small sequential samples	Obtain 100% of available, relevant data	"Just in case" data
• Flexibility of Hypothesis	Hypothesis flexible, changes as learning takes place	No hypothesis	Fixed hypothesis
• Testing Strategy	Sequential tests	No tests	One large test
• Determining if a change is an improvement	Run charts or Shewhart control charts	No change focus	Hypothesis, statistical tests (t-test, F-test, chi square), p-values
• Confidentiality of the data	Data used only by those involved with improvement	Data available for public consumption and review	Research subjects' identities protected

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Breakout

- Let's spend some time talking through measures you analyze/deal with on a day to day basis

- List 3 measures

- What is the purpose for each use?

- How much data is collected and how often?

- What type of analysis is performed?
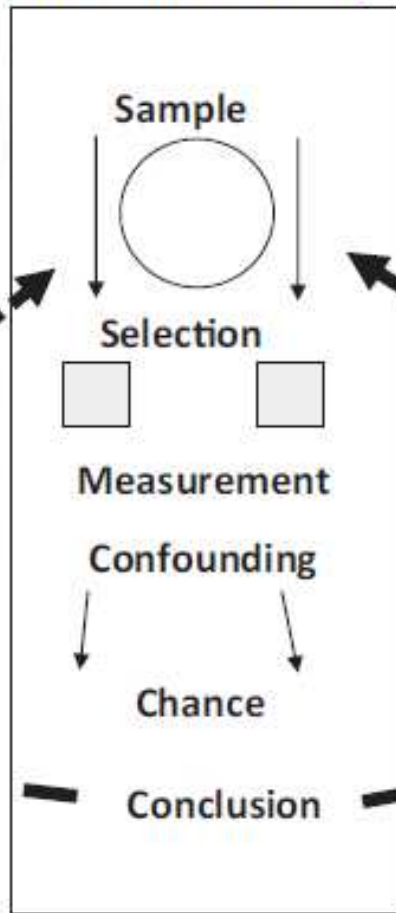
- How is the data used?

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For each measure

Aspect	Improvement	Accountability	Research
• What is the purpose for the data?			
• Sample Size - how much and how frequently?			
• What type of analysis is performed on the data?			
• How is the data used? Feedback?			

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Environment in an Enumerative Study

Internal Validity

Environment in an Analytic Study

Sample

Selection

Measurement

Confounding

Chance

Conclusion

Sample

Sample

"Internal Validity diagram from, Clinical Epidemiology, Fletcher, Fletcher, Wagner (7)

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Data Moves two Ways in our Health Care Systems

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System of Feedback

B   O$_1$ O$_2$ B

P$_1$ P$_2$ P$_1$ P$_2$

S$_1$ → S$_2$ → S$_3$ S$_1$ → S$_2$ → S$_3$

PDSA4   PDSA4

PDSA3   PDSA3

PDSA2   PDSA2

PDSA1   PDSA1
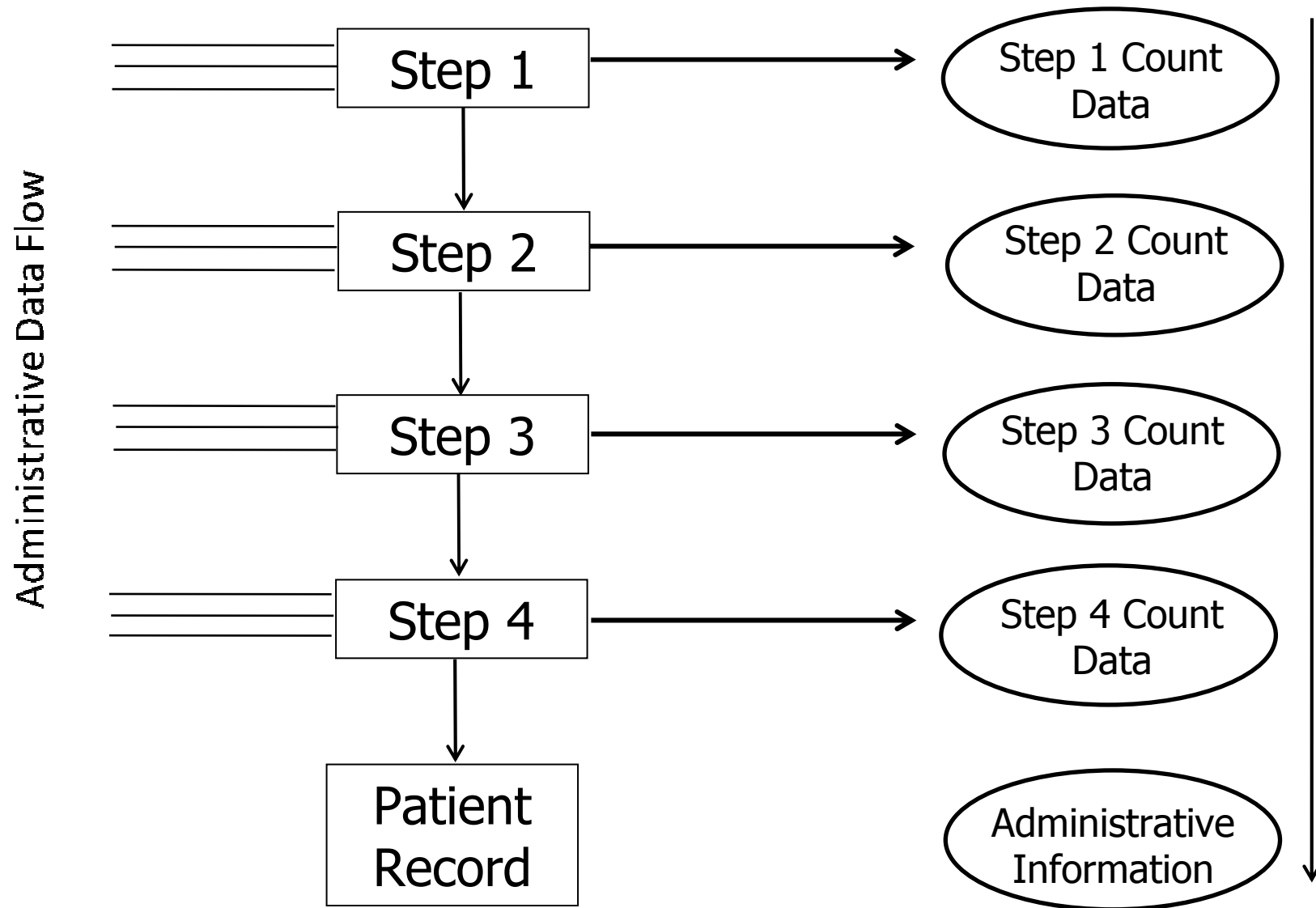
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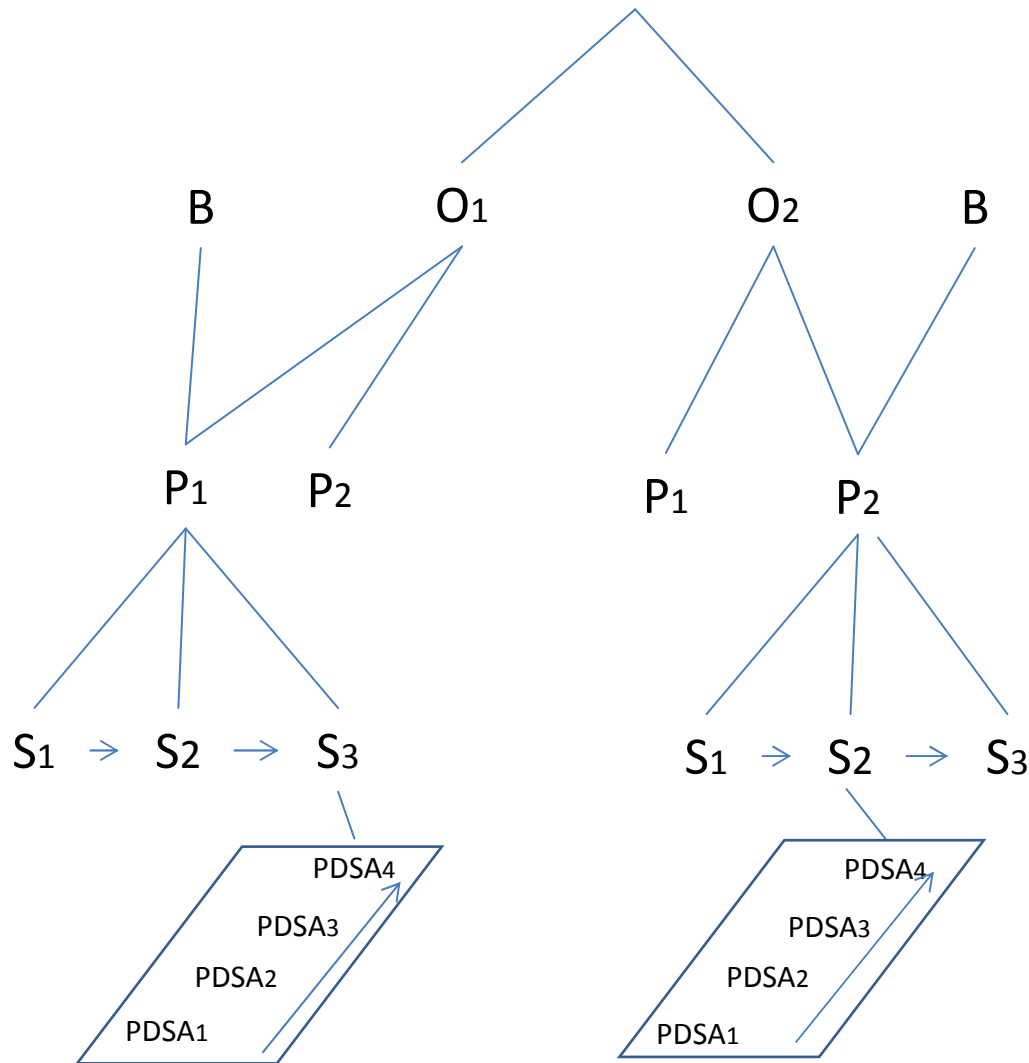
Measure Types

O = Outcome Measure

P = Process Measure

B = Balance Measure

S = Process Step Measure

PDSA = Learning Cycle Measure

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Illustrating where we might see these different types of measures for improvement

$$P_1$$

$$P_2$$

| Step 1 | → | Step 2 | → | Step N | → | Step 1 | → | Step 2 | → | Step N | → O_1 |

$$S_1$$

$$S_2$$
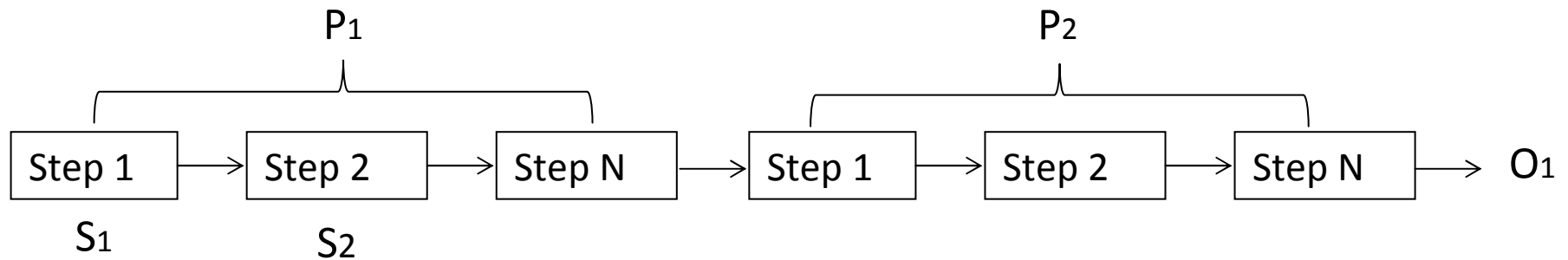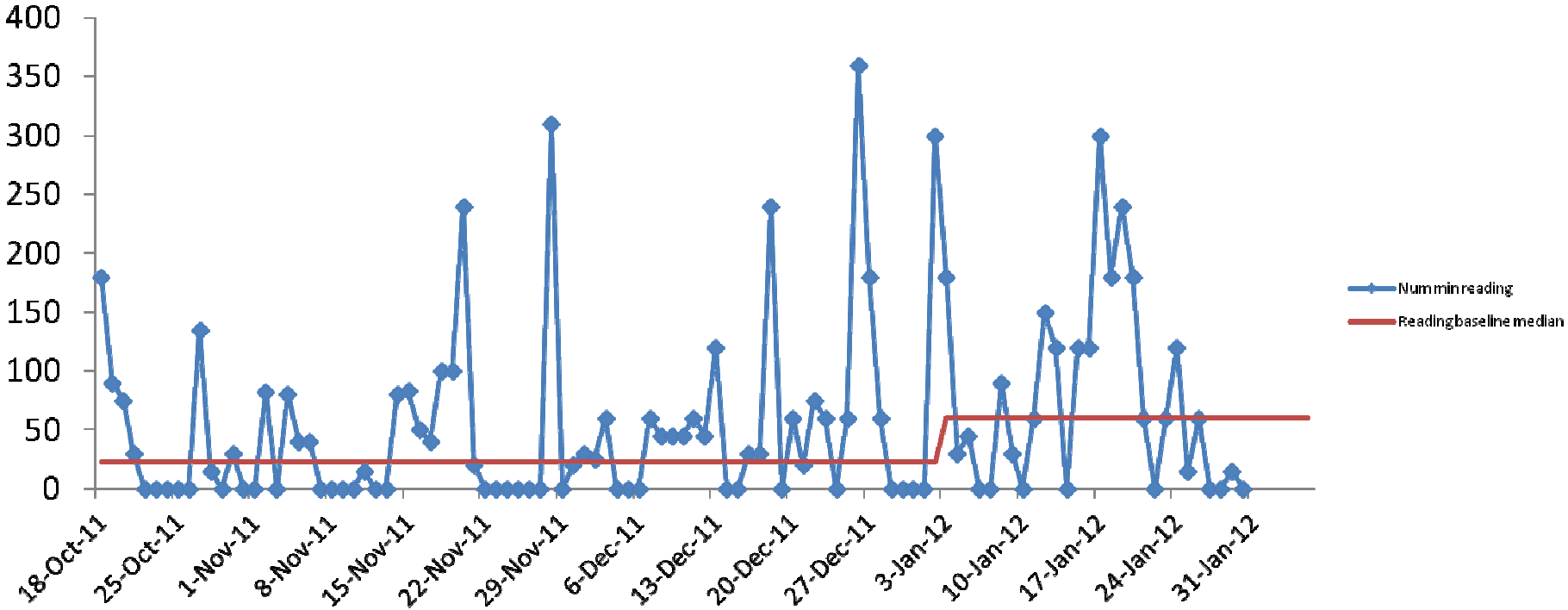
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Data Table

	A	B
1	Date	Num min reading
2	18-Oct-11	180
3	19-Oct-11	90
4	20-Oct-11	75
5	21-Oct-11	30
6	22-Oct-11	0
7	23-Oct-11	0
8	24-Oct-11	0
9	25-Oct-11	0
10	26-Oct-11	0
11	27-Oct-11	135
12	28-Oct-11	15
13	29-Oct-11	0
14	30-Oct-11	30
15	31-Oct-11	0
16	1-Nov-11	0
17	2-Nov-11	82
18	3-Nov-11	0
19	4-Nov-11	80
20	5-Nov-11	40
21	6-Nov-11	40
22	7-Nov-11	0
23	8-Nov-11	0
24	9-Nov-11	0
25	10-Nov-11	0
26	11-Nov-11	15
27	12-Nov-11	0
28	13-Nov-11	0
29	14-Nov-11	80
30	15-Nov-11	83
31	16-Nov-11	50
32	17-Nov-11	40
33	18-Nov-11	100
34	19-Nov-11	100
35	20-Nov-11	240
36	21-Nov-11	20
37	22-Nov-11	0
38	23-Nov-11	0
39	24-Nov-11	0
40	25-Nov-11	0
41	26-Nov-11	0
42	27-Nov-11	0
43	28-Nov-11	310
44	29-Nov-11	0
45	30-Nov-11	20
46	1-Dec-11	30
47	2-Dec-11	25
48	3-Dec-11	60
49	4-Dec-11	0
50	5-Dec-11	0
51	6-Dec-11	0
52	7-Dec-11	60
53	8-Dec-11	45
54	9-Dec-11	45
55	10-Dec-11	45
56	11-Dec-11	60
57	12-Dec-11	45
58	13-Dec-11	120
59	14-Dec-11	0
60	15-Dec-11	0
61	16-Dec-11	30
62	17-Dec-11	30
63	18-Dec-11	240
64	19-Dec-11	0
65	20-Dec-11	60
66	21-Dec-11	20
67	22-Dec-11	75
68	23-Dec-11	60
69	24-Dec-11	0
70	25-Dec-11	60
71	26-Dec-11	360
72	27-Dec-11	180
73	28-Dec-11	60
74	29-Dec-11	0
75	30-Dec-11	0
76	31-Dec-11	0
77	1-Jan-12	0
78	2-Jan-12	300
79	3-Jan-12	180
80	4-Jan-12	30
81	5-Jan-12	45
82	6-Jan-12	0
83	7-Jan-12	0
84	8-Jan-12	90
85	9-Jan-12	30
86	10-Jan-12	0
87	11-Jan-12	60
88	12-Jan-12	150
89	13-Jan-12	120
90	14-Jan-12	0
91	15-Jan-12	120
92	16-Jan-12	120
93	17-Jan-12	300
94	18-Jan-12	180
95	19-Jan-12	240
96	20-Jan-12	180
97	21-Jan-12	60
98	22-Jan-12	0
99	23-Jan-12	60
100	24-Jan-12	120
101	25-Jan-12	15
102	26-Jan-12	60
103	27-Jan-12	0
104	28-Jan-12	0
105	29-Jan-12	15
106	30-Jan-12	0
107	31-Jan-12	
108	1-Feb-12	
109	2-Feb-12	
110	3-Feb-12	
111	4-Feb-12	
112	5-Feb-12	
113	6-Feb-12	
114	7-Feb-12	
115	8-Feb-12	
116	9-Feb-12	
117	10-Feb-12	
118	11-Feb-12	
119	12-Feb-12	
120	13-Feb-12	
121	14-Feb-12	
122	15-Feb-12	
123	16-Feb-12	
124	17-Feb-12	
125	18-Feb-12	

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Shewhart Control Chart (Xbar chart)

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