	A	B	C	D	E	F	G	H
2		There is no analytic solution for the median given the mean and standard deviation of log-normal						
3		There is an analytic solution for std. deviation given the mean and median of a log-normal distribution.						
4		Approach						
5			1 Enter median and mean values (C9 and C10). Examine resulting standard deviation (C16)					
6			2 Adjust Median (C9) until resulting standard deviation (C16) is OK.					
7								
8		**Real-world statistics**				**Underlying math statistics**		
9		median	**19.4**	Manual Entry (LT Mean)		mu	2.965	=LN(C9)
10		mean	**20.0**	Manual Entry		mu+S^2/2	2.996	=LN(C10)
11						Sigma^2	0.061	=2*(H10-H9)
12		C14 =EXP(H9-H11)				Sigma	0.247	=SQRT(H11)
13			Mode	PDF	D14			
14			18.253	8.59E-02	=LOGNORM.DIST(C14,H$9,H$12,0)			
15								
16		StdDev	5.01	=EXP(H10)*SQRT(EXP(H11)-1)				

18 Note: As the standard deviation increases,
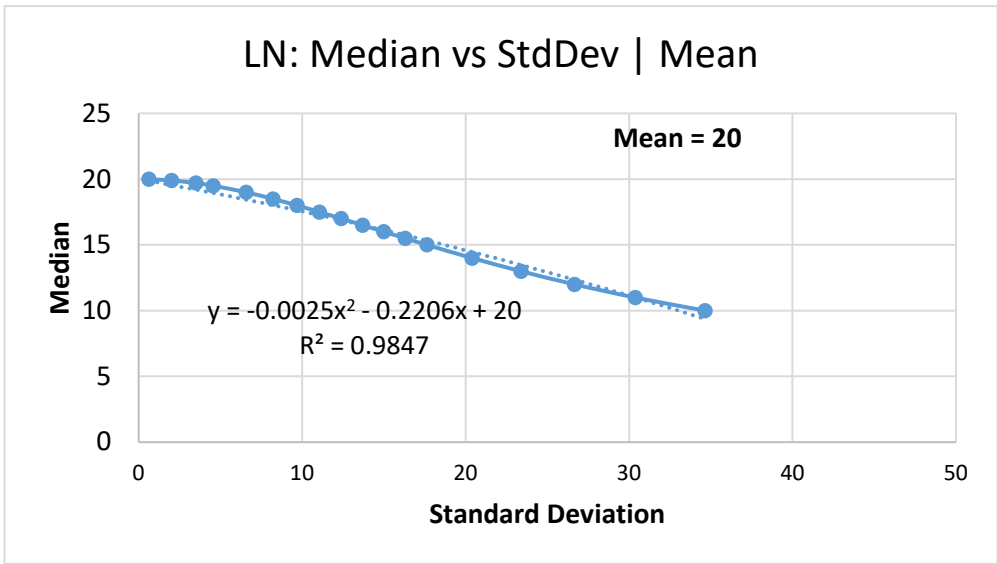
19   the mean-median ratio increases and so does the skewness (right skewed)

20   This right-skewness may result in a more conservative approach

21   since it over-weights the higher frequencies

22   and underweights the lower frequencies.

	B	C	D	E	F	G	H
25	20.0	Mean	Model Median as a function of Std. Deviation for a given Mean				
26	StdDev	Median	mu	mu+s2/2	s^2	s	
27	1	19.99	2.995	2.996	0.001	0.032	B27 =EXP(E27)*SQRT(EXP(F27)-1)
28	2	19.9	2.991	2.996	0.010	0.100	C27 Manual entries
29	4	19.7	2.981	2.996	0.030	0.174	D27 =LN(C27)
30	5	19.5	2.970	2.996	0.051	0.225	E27 =LN(B$25)
31	7	19.0	2.944	2.996	0.103	0.320	F27 =2*(E27-D27)
32	8	18.5	2.918	2.996	0.156	0.395	G27 =SQRT(F27)
33	10	18.0					
34	11	17.5					
35	12	17.0					
36	14	16.5					
37	15	16.0					
38	16	15.5					
39	18	15.0					
40	20	14.0					
41	23	13.0					
42	27	12.0					
43	30	11.0					
44	35	10.0					

LN: Median vs StdDev | Mean

Mean = 20

$y = -0.0025x^2 - 0.2206x + 20$

$R^2 = 0.9847$

(Y-axis: Median, 0 to 25; X-axis: Standard Deviation, 0 to 50)

A	B	C	D	E	F	G	H
2	There is no analytic solution for the median given the mean and standard deviation of log-normal						
3	There is an analytic solution for std. deviation given mean and median of a log-normal distribution.						
4	Approach						
5		1 Enter median and mean values (C9 and C10). Examine resulting standard deviation (C16)						
6		2 Adjust Median (C9) until resulting standard deviation (C16) is OK.						
7							
8	**Real-world statistics**				**Underlying math statistics**		
9	median	**99.5**	Manual Entry (LT Mean)		mu	4.600	=LN(C9)
10	mean	**100.0**	Manual Entry		mu+S^2/2	4.605	=LN(C10)
11					Sigma^2	0.010	=2*(H10-H9)
12		C14	=EXP(H9-H11)		Sigma	0.100	=SQRT(H11)
13		Mode	PDF	D14			
14		98.507	4.02E-02	=LOGNORM.DIST(C14,H\$9,H\$12,0)			
15							
16	StdDev	10.04	=EXP(H10)*SQRT(EXP(H11)-1)				

18 Note: As the standard deviation increases,
19   the mean-median ratio increases and so does the skewness (right skewed)
20   This right-skewness may result in a more conservative approach
21   since it over-weights the higher frequencies
22   and underweights the lower frequencies.

	B	C	D	E	F	G	H
24	B	C	D	E	F	G	H
25	100.0	Mean	Model Median as a function of Std. Deviation for a given Mean				
26	StdDev	Median	mu	mu+s2/2	s^2	s	
27	1	99.99	4.605	4.605	0.000	0.014	B27 =EXP(E27)*SQRT(EXP(F27)-1)
28	4	99.9	4.604	4.605	0.002	0.045	C27 Manual entries
29	8	99.7	4.602	4.605	0.006	0.078	D27 =LN(C27)
30	10	99.5	4.600	4.605	0.010	0.100	E27 =LN(B\$25)
31	14	99.0	4.595	4.605	0.020	0.142	F27 =2*(E27-D27)
32	18	98.5	4.590	4.605	0.030	0.174	G27 =SQRT(F27)
33	20	98.0					
34	23	97.5					
35	25	97.0					
36	27	96.5					
37	29	96.0					
38	31	95.5					
39	33	95.0					
40	36	94.0					
41	40	93.0					
42	43	92.0					
43	46	91.0					
44	48	90.0					
45							
46							

LN: Median vs StdDev | Mean

Mean = 100

$y = -0.0039x^2 - 0.0221x + 100$
$R^2 = 0.9994$

Median (y-axis)
Standard Deviation (x-axis)