METRICS UPDATE

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CNSTAT Expert Meeting on Disclosure Avoidance
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METRICS UPDATE

Metrics developed based on use cases and stakeholder feedback. Metrics will enable public to see improvements made leading up to finalization of TopDown Algorithm (TDA) for Group I data products.

- Detailed summary metrics provide accuracy, bias, and outlier information for basic demographic tabulations and specific use cases.
- Census Bureau posted detailed summary metrics for public feedback; reviewing and incorporating feedback to provide revised set of metrics by end of June.
- Algorithmic comparison metrics used to examine differences between multiple runs from disclosure avoidance system (DAS) that incorporated different methods and distributions of the privacy-loss budget (released in this presentation).
- Released detailed summary metrics for demonstration product and first in a series of new runs produced to show improvements.
- An improved set of detailed summary metrics will be released for current and future DAS runs to publicly show improvements.

https://www.census.gov/programs-surveys/decennial-census/2020-census/planning-management/2020-census-data-products/2020-das-updates.html

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METRICS UPDATE

Public comments on the detailed summary metrics were shared with the CNSTAT metrics group. We continue to review the comments but are already working to incorporate a number of improvements.

- Add metrics for AIAN geographies: Federal and State AIRs, OTSAs, ANVSAs, and others based on additional feedback.
- Add metrics for additional types of geographies: School Districts, Minor Civil Divisions (MCDs).
- Improved race metrics tables.
- Improved outlier measures.
- Using green and red to show changes relative to the 2010 Demonstration Data Products.

https://www.census.gov/programs-surveys/decennial-census/2020-census/planning-management/2020-census-data-products/2020-das-updates.html

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2010 Demonstration Data Products Metrics

Table 1: Total Population for county size categories - MAE, RMSE, MAPE, CV, MALPE, and outliers

Universe: Total population

Geography: Summary Level 050 - State-County

	Count of Units (N)	MAE	RMSE	MAPE (%)
All counties	3,143	82.18	141.39	0.78
Counties with total population less than 1,000	35	76.49	128.60	28.49
Counties with total population 1,000 to 4,999	268	62.11	74.27	2.35
Counties with total population 5,000 to 9,999	395	58.77	71.60	0.81
Counties with total population 10,000 to 49,999	1,469	58.53	73.59	0.29
Counties with total population 50,000 to 99,999	398	63.99	86.08	0.09
Counties with total population of 100,000 or more	578	180.45	287.70	0.07

The U.S. Census Bureau reviewed this data product for unauthorized disclosure of confidential information and approved the disclosure avoidance practices applied to this release. CBDRB-FY20-266.

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2010 Demonstration Data Products Metrics

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Algorithmic Comparison Metrics (MAE across algorithms)

Table 1: Total Population for county size categories – MAE

	(Dem P)	(1)	(1w)	(2)	(2w)	(3)	(3w)	(4)	(4w)	(5)	(5w)
All counties	82.18	77.81	120.20	22.73	27.40	15.95	16.66	11.43	11.06	8.64	7.79
Counties with total population less than 1,000	76.49	69.37	132.23	21.74	32.09	13.51	12.97	9.77	18.00	6.51	20.20
Counties with total population 1,000 to 4,999	62.11	72.80	112.59	20.83	28.33	14.40	16.53	9.75	11.23	7.09	6.78
Counties with total population 5,000 to 9,999	58.77	70.63	105.19	19.30	24.15	15.51	15.96	10.15	10.14	7.23	6.31
Counties with total population 10,000 to 49,999	58.53	77.30	99.32	23.04	25.17	14.75	15.61	10.57	9.73	8.17	7.02
Counties with total population 50,000 to 99,999	63.99	78.21	103.80	22.44	25.58	17.05	15.14	11.51	10.98	8.91	8.30
Counties with total population of 100,000 or more	180.45	86.57	197.61	25.40	35.85	19.42	21.12	15.34	14.64	11.46	10.13

(1) 0.05 of PLB to Total Pop
(2) 0.20 of PLB to Total Pop
(3) 0.30 of PLB to Total Pop
(4) 0.50 of PLB to Total Pop
(5) 0.75 of PLB to Total Pop
(*w) Wigglesum Variant

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Algorithmic Comparison Metrics (MAE across algorithms)

Table 2: Total Population for incorporated place size categories – MAE

	(Dem P)	(1)	(1w)	(2)	(2w)	(3)	(3w)	(4)	(4w)	(5)	(5w)
All incorporated places	85.07	169.79	168.55	77.83	78.34	54.89	53.45	41.28	35.11	32.25	25.71
Incorporated places with total population less than 1,000	43.74	106.78	87.68	53.87	54.76	38.20	41.04	28.98	27.45	22.86	19.87
Incorporated places with total population 1,000 to 4,999	66.19	168.28	163.60	75.69	76.76	53.36	51.86	39.46	34.13	31.07	25.60
Incorporated places with total population 5,000 to 9,999	99.04	209.56	219.76	91.67	93.31	63.72	60.11	49.42	40.35	37.34	29.31
Incorporated places with total population 10,000 to 49,999	174.57	298.99	342.82	127.02	131.55	90.36	81.03	66.12	51.32	52.03	38.04
Incorporated places with total population 50,000 to 99,999	326.63	429.32	517.64	178.45	169.61	129.96	109.14	100.45	65.19	72.39	48.93
Incorporated places with total population of 100,000 or more	665.22	607.17	696.45	280.89	231.41	184.46	148.99	145.72	100.80	115.58	64.91

(1) 0.05 of PLB to Total Pop
(2) 0.20 of PLB to Total Pop
(3) 0.30 of PLB to Total Pop
(4) 0.50 of PLB to Total Pop
(5) 0.75 of PLB to Total Pop
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Table 34: Sex by Selected Age Groups for counties – MAE

	(Dem P)	(1)	(1w)	(2)	(2w)	(3)	(3w)	(4)	(4w)	(5)	(5w)
Total											
Under 5 years	96.50	56.54	59.82	65.92	68.93	83.67	86.78	121.99	126.78	268.07	275.42
5 to 9 years	111.47	55.39	54.85	62.64	65.81	81.73	81.52	123.04	121.12	268.48	267.60
10 to 14 years	110.19	53.48	54.86	63.87	63.76	81.50	81.41	120.74	121.67	262.64	272.38
15 to 19 years	100.38	62.81	68.41	74.75	77.83	92.31	100.58	132.28	142.26	295.22	318.38
20 to 24 years	100.12	74.13	74.11	86.95	92.67	106.48	115.20	154.28	164.69	328.98	347.44
25 to 29 years	107.86	63.21	66.49	76.12	82.96	95.39	104.44	138.78	152.07	309.50	323.77
30 to 34 years	114.02	60.26	62.75	70.14	78.67	89.38	99.10	130.42	143.82	295.47	298.77
35 to 39 years	97.79	56.74	59.40	68.94	75.34	87.08	93.27	129.09	140.41	291.88	307.83
40 to 44 years	97.65	55.22	57.07	67.53	71.14	84.14	91.87	123.85	132.81	296.98	297.86
45 to 49 years	116.99	55.72	55.16	67.81	70.87	87.00	90.88	128.56	134.16	297.82	303.17
50 to 54 years	110.95	54.37	53.24	64.87	67.29	84.56	86.22	123.13	129.37	295.69	292.75
55 to 59 years	97.19	53.39	51.95	60.65	63.24	82.07	82.81	119.96	125.34	281.64	288.53
60 to 64 years	99.92	52.10	49.43	59.38	62.09	81.74	79.28	117.78	120.55	274.88	277.70
65 to 69 years	99.45	48.96	50.42	61.21	62.96	76.22	79.09	114.86	121.18	264.72	270.28
70 to 74 years	99.40	48.66	48.81	58.43	62.86	76.12	81.51	107.95	118.80	249.46	256.76
75 to 79 years	85.14	48.26	50.42	56.56	64.23	72.49	81.13	107.24	116.90	235.12	242.29
80 to 84 years	80.09	45.92	49.58	53.93	65.96	69.43	79.58	102.63	113.60	221.77	228.09
85 to 89 years	78.29	43.55	49.82	50.20	63.38	65.74	74.40	95.58	105.44	197.90	217.66
90 to 94 years	65.03	36.63	41.48	42.58	54.07	53.44	63.09	74.82	86.67	158.49	180.33
95 to 99 years	39.15	25.70	30.20	29.91	39.70	35.26	46.08	47.07	62.80	79.92	124.52
100 to 104 years	10.77	10.04	15.35	11.19	21.23	12.86	23.87	14.06	33.05	19.53	66.91
105 to 109 years	3.71	2.34	8.77	2.38	11.50	2.80	13.40	3.06	14.55	4.98	29.01
110 to 115 years	4.27	1.94	5.81	1.87	8.32	2.43	10.68	2.95	12.59	5.05	29.83

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Table 34: Sex by Selected Age Groups for counties – MAE

	(Dem P)	(1)	(1w)	(2)	(2w)	(3)	(3w)	(4)	(4w)	(5)	(5w)
Male											
Under 5 years	69.44	43.10	44.09	49.73	49.90	63.55	63.76	90.81	96.16	198.53	209.15
5 to 9 years	77.05	41.06	41.32	49.74	48.79	61.30	64.28	90.62	90.76	204.45	204.73
10 to 14 years	78.75	40.95	41.46	48.90	49.84	62.24	61.77	92.16	92.51	206.27	204.22
15 to 19 years	70.65	44.53	46.32	51.84	54.12	65.54	70.02	96.09	101.05	212.92	223.00
20 to 24 years	70.82	49.54	48.73	59.72	59.97	73.36	76.73	104.79	108.73	225.72	230.20
25 to 29 years	77.78	44.02	45.54	52.47	54.30	67.94	70.21	99.63	102.67	216.49	223.85
30 to 34 years	80.47	42.90	42.49	49.85	52.97	65.39	67.58	94.93	99.36	215.35	215.17
35 to 39 years	69.31	41.03	41.11	49.18	51.43	62.85	65.30	93.05	97.63	207.43	215.95
40 to 44 years	71.30	40.62	40.61	48.07	48.83	61.89	64.05	90.52	93.32	215.30	210.22
45 to 49 years	81.38	40.30	37.60	47.27	48.87	61.78	64.21	92.50	94.84	209.88	213.50
50 to 54 years	77.86	38.50	37.55	47.10	46.98	59.72	60.06	87.91	90.66	209.83	209.55
55 to 59 years	67.81	38.46	36.53	44.75	44.67	57.33	58.52	84.33	88.99	199.41	200.29
60 to 64 years	69.37	36.19	34.59	41.53	42.85	56.16	55.54	82.08	86.05	192.08	197.18
65 to 69 years	70.85	33.64	34.24	40.64	43.34	52.67	55.21	76.85	83.00	184.61	179.68
70 to 74 years	68.36	32.28	32.79	39.03	41.00	49.71	53.98	72.95	80.43	172.12	176.60
75 to 79 years	59.83	31.48	32.98	37.54	41.53	48.64	52.38	70.86	75.64	155.56	159.49
80 to 84 years	53.64	29.45	31.65	36.16	40.53	46.02	50.09	63.96	72.31	140.98	147.60
85 to 89 years	49.75	26.80	29.96	31.36	38.48	40.59	44.68	58.69	64.69	115.81	131.30
90 to 94 years	36.73	20.61	23.36	24.43	28.93	30.35	34.49	40.42	47.40	78.06	94.52
95 to 99 years	16.84	11.83	14.61	13.44	18.60	15.64	21.01	19.69	28.69	26.47	57.65
100 to 104 years	3.11	3.12	6.31	3.28	9.27	3.56	10.41	3.86	13.92	4.96	28.11
105 to 109 years	1.76	0.93	3.98	1.00	4.91	1.23	5.27	1.33	6.19	2.42	11.84
110 to 115 years	2.09	0.97	2.79	0.95	3.83	1.15	5.21	1.47	6.69	2.61	14.06

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	(Dem P)	(1)	(1w)	(2)	(2w)	(3)	(3w)	(4)	(4w)	(5)	(5w)
Female											
Under 5 years	70.14	41.32	42.56	50.70	49.77	63.55	65.47	90.34	95.43	205.78	204.28
5 to 9 years	79.72	42.31	40.30	48.55	48.29	60.93	62.74	91.26	93.49	203.76	204.89
10 to 14 years	76.29	41.46	39.81	48.00	47.62	60.85	62.62	90.83	91.81	198.80	205.08
15 to 19 years	70.63	43.13	45.83	50.65	53.25	64.47	69.38	91.24	98.48	212.28	221.16
20 to 24 years	68.64	46.63	46.70	54.00	57.74	68.01	73.87	97.53	107.21	221.81	228.22
25 to 29 years	75.81	41.47	43.64	51.78	54.54	63.35	68.89	92.62	102.13	212.97	218.63
30 to 34 years	79.96	41.54	42.96	48.11	52.70	60.99	66.45	90.98	96.61	203.05	215.96
35 to 39 years	67.95	39.40	41.47	48.73	51.42	60.31	64.70	91.53	97.65	207.81	211.76
40 to 44 years	67.20	37.87	39.46	47.36	48.30	61.74	64.53	88.61	92.61	205.14	208.68
45 to 49 years	81.84	38.30	39.72	48.50	48.50	60.34	62.67	88.02	94.45	212.90	209.25
50 to 54 years	78.47	38.73	37.84	45.40	46.81	58.57	60.74	87.91	89.28	210.96	207.80
55 to 59 years	69.43	37.21	37.69	44.19	44.89	59.09	57.69	87.43	89.53	205.19	207.08
60 to 64 years	70.50	35.46	35.10	42.35	43.63	57.41	57.24	82.23	82.43	197.49	197.65
65 to 69 years	71.30	34.98	33.93	42.21	42.34	53.24	53.67	81.80	83.14	182.96	188.41
70 to 74 years	70.50	33.34	32.65	40.19	42.80	52.61	55.56	75.14	80.49	173.17	182.31
75 to 79 years	62.35	32.40	33.48	38.47	41.95	49.60	53.20	74.62	78.96	168.44	168.76
80 to 84 years	58.41	31.27	32.74	36.92	42.16	47.28	51.97	72.04	76.31	159.74	164.76
85 to 89 years	58.58	29.42	31.91	34.40	39.70	45.24	50.57	64.43	69.51	143.06	148.13
90 to 94 years	50.80	25.85	27.44	29.84	36.26	37.65	42.87	53.40	59.71	113.94	122.70
95 to 99 years	31.87	18.84	21.21	21.97	27.04	26.12	32.39	36.00	43.35	65.37	82.36
100 to 104 years	9.59	8.47	11.13	9.34	14.22	10.89	15.77	12.09	21.76	16.94	41.79
105 to 109 years	2.16	1.73	5.09	1.75	6.87	1.88	8.41	2.10	8.68	2.95	17.46
110 to 115 years	2.19	0.99	3.05	0.94	4.51	1.30	5.49	1.50	5.92	2.47	15.80

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Table 32: Sex by Selected Age Groups for counties – MAE

	(Dem P)	(1)	(1w)	(2)	(2w)	(3)	(3w)	(4)	(4w)	(5)	(5w)
Total											
0 to 17 years	46.43	47.68	68.15	35.10	48.52	42.95	54.47	58.90	80.93	108.55	143.88
18 to 64 years	99.17	162.22	196.91	187.58	260.97	231.70	304.55	322.10	405.91	674.53	844.18
65 years and over	103.04	159.37	207.65	187.85	283.09	230.85	324.58	321.71	434.01	667.02	879.74
Male											
0 to 17 years	65.52	64.39	66.77	72.81	72.56	92.39	96.62	133.62	141.41	295.18	305.68
18 to 64 years	90.78	132.85	132.25	154.40	174.94	195.33	213.62	286.12	307.80	620.53	640.19
65 years and over	74.38	91.11	115.74	108.35	155.29	137.97	182.03	187.55	251.89	404.05	514.75
Female											
0 to 17 years	64.36	64.10	67.30	73.46	72.60	93.18	96.03	133.67	139.25	295.10	305.61
18 to 64 years	93.85	117.05	143.48	141.21	186.29	181.53	219.64	258.39	309.31	571.34	664.22
65 years and over	73.49	102.04	118.25	118.80	160.85	147.95	188.98	212.36	258.48	459.61	530.36

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