

Effective Use of Heat Maps

- Purpose** This tool provides guidelines and tips on how to effectively use heat maps to communicate research findings.
- Format** This tool provides guidance on heat maps and their purposes, and shows examples of preferred practices and practical tips for heat maps.
- Audience** This tool is designed primarily for researchers from the Model Systems that are funded by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR). The tool can be adapted by other NIDILRR-funded grantees and the general public.

The contents of this tool were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90DP0012-01-00). The contents of this fact sheet do not necessarily represent the policy of Department of Health and Human Services, and you should not assume endorsement by the Federal Government.

Heat Maps

- ▶ Heat Maps (in their most basic formulation) are simply cross tabulation tables with color coding (typically red-yellow-green) overlaid on each cell to visually highlight high-low patterns in the row-column interactions in the crosstab data.
- ▶ Example: Crosstab table providing counts of car crashes by day of week and time of day, in which peak car crash periods [such as the afternoon school pick-up and evening commute hours Monday-Friday] are shaded red, with lower crash periods shaded yellow and green.
- ▶ Basic Heat Maps can be created in Excel using Conditional Formatting and Color Scaling.
- ▶ Two-color and three-color scaling is common. Cell values may be displayed. Alternatively, cell values may be represented as color variations only - with a legend to provide the color value ranges and perhaps some context (green = acceptable red = poor etc).

Heat Maps

- ▶ Some heat maps use icons in the crosstab cells to convey meaning – Red-Yellow-Green [RYG] stoplight circles, Green Check Marks vs Red X's, Horizontal Bars to convey magnitude, etc.
- ▶ Red-yellow-green categories ranges can be defined using absolute range values (17.0 to 29.7 = green... 70.1 to 93.2 = red) or can be defined in terms of percentage ranges, or percentiles etc.
- ▶ More advanced heat maps found in dedicated data visualization software packages can convey third-factor information (beyond the row and column factors) through changes in the size of an icon within any given intersection of crosstab row and column.

Heat Maps

TIME OF DAY	MON	TUE	WED	THU	FRI	SAT	SUN
1200 AM - 1259 AM	1,131	976	1,076	1,174	1,353	2,336	2,276
0100 AM - 0159 AM	656	618	645	762	1,014	2,022	2,062
0200 AM - 0259 AM	607	532	607	780	1,018	2,423	2,496
0300 AM - 0359 AM	524	470	475	574	730	1,527	1,716
0400 AM - 0459 AM	533	488	489	617	717	1,260	1,352
0500 AM - 0559 AM	1,025	999	1,000	1,033	1,064	1,189	1,194
0600 AM - 0659 AM	1,941	2,024	1,990	1,972	1,905	1,270	1,065
0700 AM - 0759 AM	3,933	4,206	4,112	3,928	3,654	1,325	1,056
0800 AM - 0859 AM	3,212	3,332	3,504	3,277	3,167	1,702	1,054
0900 AM - 0959 AM	2,697	2,733	2,693	2,631	2,778	2,228	1,437
1000 AM - 1059 AM	2,977	2,841	2,848	2,913	3,283	2,832	1,966
1100 AM - 1159 AM	3,635	3,540	3,598	3,587	4,265	3,437	2,176
1200 PM - 1259 PM	4,379	4,233	4,166	4,154	5,160	4,018	2,820
0100 PM - 0159 PM	4,056	3,938	3,885	3,934	5,029	3,967	2,935
0200 PM - 0259 PM	4,415	4,496	4,404	4,363	5,431	3,878	3,010
0300 PM - 0359 PM	5,519	5,627	5,452	5,650	6,751	4,008	3,207
0400 PM - 0459 PM	5,479	5,502	5,421	5,677	6,499	3,917	3,177
0500 PM - 0559 PM	5,941	6,093	6,086	6,115	6,287	3,844	3,488
0600 PM - 0659 PM	3,821	4,113	3,917	4,125	4,735	3,830	3,230
0700 PM - 0759 PM	2,493	2,604	2,722	2,733	3,416	3,203	2,735
0800 PM - 0859 PM	2,035	2,210	2,293	2,423	2,886	2,985	2,549
0900 PM - 0959 PM	1,885	1,888	2,048	2,148	2,929	2,791	2,066
1000 PM - 1059 PM	1,389	1,405	1,515	1,748	2,614	2,646	1,635
1100 PM - 1159 PM	1,111	1,004	1,079	1,314	2,216	2,441	1,343

Total Vehicle Crashes By Day of Week and Time of Day – Mock State – 2014

Peak crashes during the after-school pickup hours through the drive home commute hours M-F, with highest crash volumes on Friday during such periods.

Heat Maps

TIME OF DAY	MON	TUE	WED	THU	FRI	SAT	SUN
1200 AM - 1259 AM	1,131	976	1,076	1,174	1,353	2,336	2,276
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0200 AM - 0259 AM	607	532	607	780	1,018	2,423	2,496
0300 AM - 0359 AM	524	470	475	574	730	1,527	1,716
0400 AM - 0459 AM	533	488	489	617	717	1,260	1,352
0500 AM - 0559 AM	1,025	999	1,000	1,033	1,064	1,189	1,194
0600 AM - 0659 AM	1,941	2,024	1,990	1,972	1,905	1,270	1,065
0700 AM - 0759 AM	3,933	4,206	4,112	3,928	3,654	1,325	1,056
0800 AM - 0859 AM	3,212	3,332	3,504	3,277	3,167	1,702	1,054
0900 AM - 0959 AM	2,697	2,733	2,693	2,631	2,778	2,228	1,437
1000 AM - 1059 AM	2,977	2,841	2,848	2,913	3,283	2,832	1,966
1100 AM - 1159 AM	3,635	3,540	3,598	3,587	4,265	3,437	2,176
1200 PM - 1259 PM	4,379	4,233	4,166	4,154	5,160	4,018	2,820
0100 PM - 0159 PM	4,056	3,938	3,885	3,934	5,029	3,967	2,935
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0400 PM - 0459 PM	5,479	5,502	5,421	5,677	6,499	3,917	3,177
0500 PM - 0559 PM	5,941	6,093	6,086	6,115	6,287	3,844	3,488
0600 PM - 0659 PM	3,821	4,113	3,917	4,125	4,735	3,830	3,230
0700 PM - 0759 PM	2,493	2,604	2,722	2,733	3,416	3,203	2,735
0800 PM - 0859 PM	2,035	2,210	2,293	2,423	2,886	2,985	2,549
0900 PM - 0959 PM	1,885	1,888	2,048	2,148	2,929	2,791	2,066
1000 PM - 1059 PM	1,389	1,405	1,515	1,748	2,614	2,646	1,635
1100 PM - 1159 PM	1,111	1,004	1,079	1,314	2,216	2,441	1,343

Total Vehicle Crashes By Day of Week and Time of Day – Mock State – 2014

Peak total crashes during the after-school pickup hours through the drive home commute hours M-F, with highest crash volumes on Friday during such periods.

TIME OF DAY	MON	TUE	WED	THU	FRI	SAT	SUN
1200 AM - 1259 AM	44	32	44	47	49	100	80
0100 AM - 0159 AM	34	17	28	24	40	80	85
0200 AM - 0259 AM	32	26	20	33	64	120	93
0300 AM - 0359 AM	25	19	25	26	27	57	65
0400 AM - 0459 AM	20	26	18	26	40	58	66
0500 AM - 0559 AM	40	31	28	30	21	44	44
0600 AM - 0659 AM	38	42	30	28	42	39	29
0700 AM - 0759 AM	35	36	36	42	30	27	22
0800 AM - 0859 AM	29	26	28	24	25	26	21
0900 AM - 0959 AM	30	21	22	24	20	22	18
1000 AM - 1059 AM	32	21	29	27	30	36	27
1100 AM - 1159 AM	24	25	36	27	23	34	35
1200 PM - 1259 PM	38	37	40	36	45	45	39
0100 PM - 0159 PM	31	39	35	29	35	55	35
0200 PM - 0259 PM	33	41	42	34	45	42	43
0300 PM - 0359 PM	41	49	46	40	53	49	42
0400 PM - 0459 PM	44	43	30	58	55	58	52
0500 PM - 0559 PM	59	48	45	45	62	55	64
0600 PM - 0659 PM	39	53	45	56	68	64	62
0700 PM - 0759 PM	46	49	57	50	67	70	59
0800 PM - 0859 PM	57	54	52	54	74	88	73
0900 PM - 0959 PM	54	42	70	60	62	84	58
1000 PM - 1059 PM	36	39	58	48	80	84	54
1100 PM - 1159 PM	40	32	40	43	79	80	47

Fatal Vehicle Crashes By Day of Week and Time of Day – Mock State – 2014

Peak fatal crashes during the Friday night and Saturday night out-of-home drinking hours with highest fatal crash volumes on early Saturday morning and early Sunday morning after the bars close.

Heat Maps

TIME OF DAY	MON	TUE	WED	THU	FRI	SAT	SUN
1200 AM - 1259 AM	✓1,131	✓976	✓1,076	✓1,174	✓1,353	✓2,336	✓2,276
0100 AM - 0159 AM	✓656	✓618	✓645	✓762	✓1,014	✓2,022	✓2,062
0200 AM - 0259 AM	✓607	✓532	✓607	✓780	✓1,018	✓2,423	✓2,496
0300 AM - 0359 AM	✓524	✓470	✓475	✓574	✓730	✓1,527	✓1,716
0400 AM - 0459 AM	✓533	✓488	✓489	✓617	✓717	✓1,260	✓1,352
0500 AM - 0559 AM	✓1,025	✓999	✓1,000	✓1,033	✓1,064	✓1,189	✓1,194
0600 AM - 0659 AM	✓1,941	✓2,024	✓1,990	✓1,972	✓1,905	✓1,270	✓1,065
0700 AM - 0759 AM	⚠3,933	⚠4,206	⚠4,112	⚠3,928	⚠3,654	✓1,325	✓1,056
0800 AM - 0859 AM	⚠3,212	⚠3,332	⚠3,504	⚠3,277	⚠3,167	✓1,702	✓1,054
0900 AM - 0959 AM	⚠2,697	⚠2,733	⚠2,693	⚠2,631	⚠2,778	✓2,228	✓1,437
1000 AM - 1059 AM	⚠2,977	⚠2,841	⚠2,848	⚠2,913	⚠3,283	⚠2,832	✓1,966
1100 AM - 1159 AM	⚠3,635	⚠3,540	⚠3,598	⚠3,587	⚠4,265	⚠3,437	✓2,176
1200 PM - 1259 PM	⚠4,379	⚠4,233	⚠4,166	⚠4,154	✗5,160	⚠4,018	⚠2,820
0100 PM - 0159 PM	⚠4,056	⚠3,938	⚠3,885	⚠3,934	✗5,029	⚠3,967	⚠2,935
0200 PM - 0259 PM	⚠4,415	⚠4,496	⚠4,404	⚠4,363	✗5,431	⚠3,878	⚠3,010
0300 PM - 0359 PM	✗5,519	✗5,627	✗5,452	✗5,650	✗6,751	⚠4,008	⚠3,207
0400 PM - 0459 PM	✗5,479	✗5,502	✗5,421	✗5,677	✗6,499	⚠3,917	⚠3,177
0500 PM - 0559 PM	✗5,941	✗6,093	✗6,086	✗6,115	✗6,287	⚠3,844	⚠3,488
0600 PM - 0659 PM	⚠3,821	⚠4,113	⚠3,917	⚠4,125	✗4,735	⚠3,830	⚠3,230
0700 PM - 0759 PM	✓2,493	⚠2,604	⚠2,722	⚠2,733	⚠3,416	⚠3,203	⚠2,735
0800 PM - 0859 PM	✓2,035	✓2,210	✓2,293	✓2,423	⚠2,886	⚠2,985	⚠2,549
0900 PM - 0959 PM	✓1,885	✓1,888	✓2,048	✓2,148	⚠2,929	⚠2,791	✓2,066
1000 PM - 1059 PM	✓1,389	✓1,405	✓1,515	✓1,748	⚠2,614	⚠2,646	✓1,635
1100 PM - 1159 PM	✓1,111	✓1,004	✓1,079	✓1,314	✓2,216	✓2,441	✓1,343

Some heat maps use icons in the crosstab cells to convey meaning – Red-Yellow-Green [RYG] stoplight circles, green check marks vs red X's etc

Can include or exclude the values.

Can include or exclude the shading.

Heat Maps

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0400 AM - 0459 AM	533	488	489	617	717	1,260	1,352
0500 AM - 0559 AM	1,025	999	1,000	1,033	1,064	1,189	1,194
0600 AM - 0659 AM	1,941	2,024	1,990	1,972	1,905	1,270	1,065
0700 AM - 0759 AM	3,933	4,206	4,112	3,928	3,654	1,325	1,056
0800 AM - 0859 AM	3,212	3,332	3,504	3,277	3,167	1,702	1,054
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1000 PM - 1059 PM	1,389	1,405	1,515	1,748	2,614	2,646	1,635
1100 PM - 1159 PM	1,111	1,004	1,079	1,314	2,216	2,441	1,343

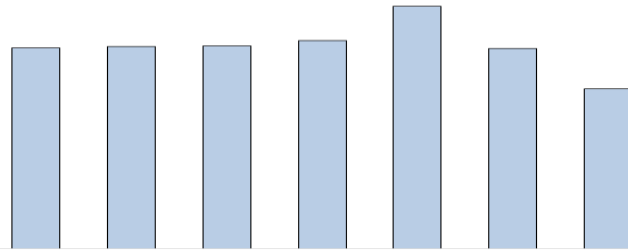
Some heat maps use mini-bars in the crosstab cells to convey magnitude.

Can include or exclude the values.

Can include or exclude the shading.

TIME OF DAY	MON	TUE	WED	THU	FRI	SAT	SUN
1200 AM - 1259 AM	1,131	976	1,076	1,174	1,353	2,336	2,276
0100 AM - 0159 AM	656	618	645	762	1,014	2,022	2,062
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0500 AM - 0559 AM	1,025	999	1,000	1,033	1,064	1,189	1,194
0600 AM - 0659 AM	1,941	2,024	1,990	1,972	1,905	1,270	1,065
0700 AM - 0759 AM	3,933	4,206	4,112	3,928	3,654	1,325	1,056
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1100 PM - 1159 PM	1,111	1,004	1,079	1,314	2,216	2,441	1,343

Heat Maps



Total Vehicle Crashes.
Some Heat Maps will overlay the row and columns total histograms for reference

TIME OF DAY	MON	TUE	WED	THU	FRI	SAT	SUN
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