A Simple Approach to Combining Multi-System Data For Statewide Planning

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Statewide Planning and Resource Allocation

- Problem: Limited resources versus (limitless) need
- Process
  - Regional Planning Councils rank local priorities
  - State-level allocation of available resources with input from key stakeholders, providers, statewide planning council
- Problems
  - “The squeaky wheel”
  - Information “overload”
  - Non-systematic use of available data
  - Subjective Process
  - So… what happens?

The Objective

- Use *existing* system data more effectively
  - Lack of proximal outcome data, but abundance of distal system-level information
  - As one source of information in a broader planning process
  - With community/stakeholder/expert interpretation

- Benefits
  - Identify areas of need
  - Raise issues for discussion
  - Provide objective basis for decisions

Problems with Use of Existing Information

- Overload
  - Too many sources
  - Findings frequently conflict
  - Many stakeholders lack experience with data
- Format differences
  - Counts (sensitive to population)
  - Percentages/proportions/rates
  - Rankings
- Bias/Inconsistency
  - County-level anomalies
  - Statewide bias
- Difficulty of comparing across variables

An Example From Tennessee: Children's Services

- Problem: Where to place new children's programs?
- Program experts selected key data indicators
  - Selection driven by available information, theory, and experience
- Data Sources
  - TN Dept of Mental Health and Developmental Disabilities
  - TN Dept of Health
  - TennCare Partners (Medicaid)
  - TN Dept of Children's Services
  - TN Dept of Education
  - TN Commission on Children and Youth

Existing System Indicators

- Observed Problems
  - SED Rates (from BHO & Schools)
  - Referrals to Juvenile Court
  - Children in State Custody
  - Inpatient Psychiatric Admissions (<18 yo)
  - School Suspensions & Dropouts
- Risk Factors
  - % of children in free/reduced lunch
  - % of low birthweight babies
  - Births to young (10-17) or unmarried mothers

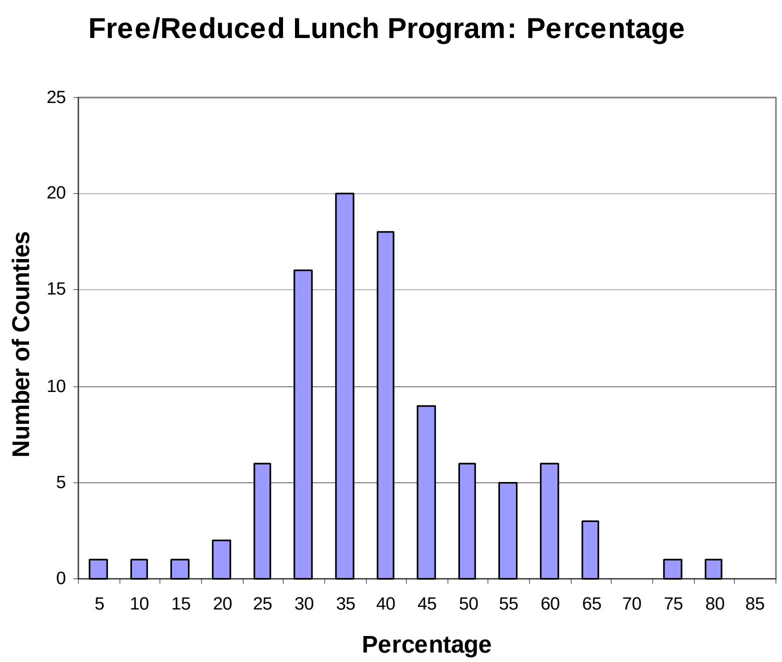
Develop A Common Metric For All Indicators

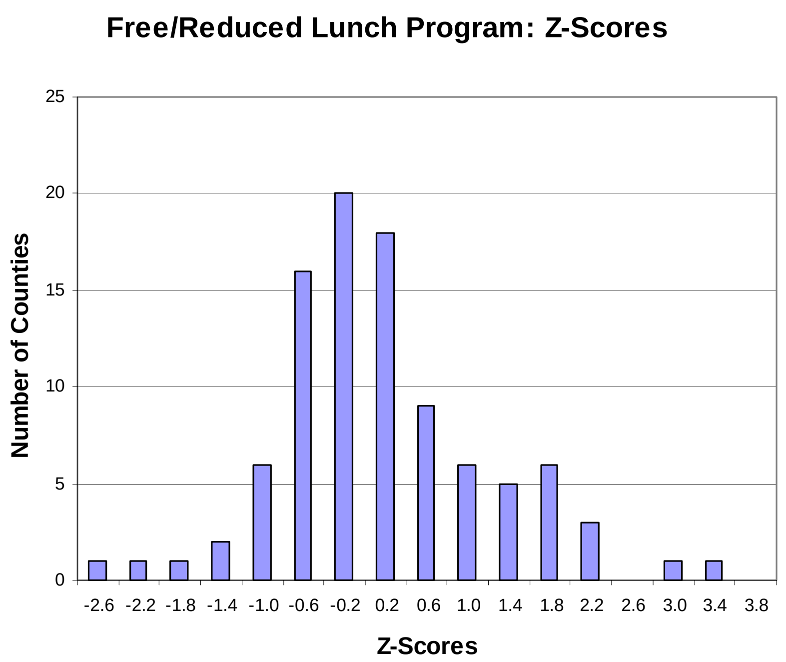
- Convert data to proportions (remove population weight)
- Central Limit Theorem - the distribution of sample (i.e., county) means (or *p)* will be normal if N is large (>30).
- Z-scores are distributed normally
- We can therefore convert county-level proportions to Z-scores

Beneficial Properties of Z-Scores

- Uses existing data to assign new scores to all variables with mean = 0 and standard deviation = 1
- Does not change the shape of the existing distribution
- Z-scores have corresponding percentile values based upon the normal distribution (allowing us to create statewide percentile ranks for county data)
- Comparison becomes easy: A “1” for one variable means the same thing as a “1” for another variable.

An Example: School Lunch Program





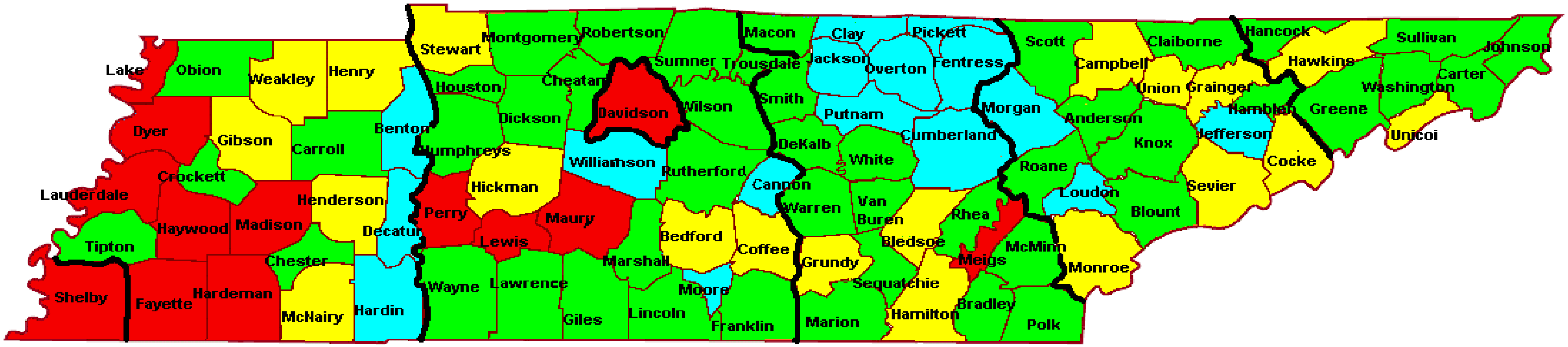
Calculating Scores in Excel

		Column A	Column B	Column C	Column D	Column E
	COUNTY	% in Lunch Prog	mean % lunch	stdev % lunch	Z % lunch	State %tile Lunch
	Excel Syntax		***AVE(A1:A(x))***	***STDEV(A1:A(x))***	***(A1-B1)/C1***	***100*(NORM SDIST(D1))***
1	Lauderdale	57.50	37.63	12.39	1.60	94.6
2	Hardeman	60.30	37.63	12.39	1.83	96.6
3	Haywood	73.50	37.63	12.39	2.89	99.8
4	Fayette	76.50	37.63	12.39	3.14	99.9
5	Davidson	35.40	37.63	12.39	-0.18	42.9
6	Madison	44.10	37.63	12.39	0.52	69.9
7	Lewis	34.90	37.63	12.39	-0.22	41.3
8	Shelby	39.10	37.63	12.39	0.12	54.7
9	Meigs	47.10	37.63	12.39	0.76	77.8
10	Dyer	33.50	37.63	12.39	-0.33	36.9
11	Maury	27.70	37.63	12.39	-0.80	21.1
12	Perry	38.90	37.63	12.39	0.10	54.1
13	Lake	59.40	37.63	12.39	1.76	96.0

Overall County Percentile Ranks (see handout for detail)

COUNTY	Population under 18 yo	State %tile juv ct	State %tile cust	State %tile Lunch	State %tile Birth 10-17	State %tile Unmarr	State %tile Low Brthwt	State %tile SED (DOE)	State %tile SED (BHO)	State %tile inpt admits	State % Suspension Rate	State % Dropout Rate	%tile Risk Total	%tile Observed Total	Z score adjusted total	weighted %tile adjusted (1*Risk + 2*Observed) Total
Lauderdale	4,638	99.7	100.0	94.6	100.0	99.5	99.9	45.4	79.2	100.0	92.5	72.8	100.0	100.0	4.21	100.0
Hardeman	3,905	88.9	49.1	96.6	98.3	99.9	95.1	83.8	99.1	100.0	87.7	85.9	99.9	99.8	3.31	100.0
Haywood	2,570	34.7	97.8	99.8	76.6	99.8	63.7	32.6	100.0	82.4	65.3	96.8	99.1	99.8	2.96	99.8
Fayette	4,888	18.5	59.5	99.9	77.8	99.0	99.5	86.5	30.9	66.5	100.0	99.6	99.9	97.9	2.63	99.6
Davidson	92,053	98.7	65.5	42.9	78.4	92.0	79.9	99.3	99.6	62.2	97.2	87.0	84.0	99.9	2.59	99.5
Madison	14,801	48.4	78.2	69.9	59.9	92.6	42.5	99.3	99.9	99.7	47.8	76.1	76.1	99.6	2.20	98.6
Lewis	2,866	40.5	18.1	41.3	48.2	69.6	84.2	100.0	61.3	100.0	26.6	74.5	66.9	98.7	1.80	96.4
Shelby	118,977	84.6	88.2	54.7	91.9	99.8	95.1	52.3	70.5	26.4	44.2	96.0	98.2	84.8	1.53	93.7
Meigs	2,428	25.9	100.0	77.8	94.2	24.3	81.4	11.3	24.0	22.3	99.0	55.5	81.2	91.1	1.32	90.7
Dyer	8,570	60.4	35.3	36.9	93.0	92.6	21.6	48.9	72.3	99.5	78.0	27.7	73.6	80.8	0.87	80.8
Maury	16,268	93.7	42.7	21.1	59.1	89.0	55.4	73.8	58.0	67.6	28.3	93.9	60.9	83.7	0.82	79.5
Perry	1,928	42.4	19.6	54.1	56.8	53.7	67.7	99.9	33.2	59.6	71.3	83.4	61.4	83.2	0.81	79.2
Lake	1,270	64.2	30.5	96.0	73.5	99.5	82.8	11.3	94.4	50.0	25.0	61.6	98.1	48.4	0.73	76.9
Bedford	8,493	34.7	73.4	19.8	69.4	80.8	67.7	25.5	46.6	49.1	98.3	74.5	63.5	72.9	0.58	71.8
Grundy	3,946	21.3	85.1	71.9	41.1	46.1	79.9	23.7	28.0	30.3	17.3	100.0	64.9	71.1	0.55	70.9
Unicoi	3,819	36.6	22.1	42.9	65.9	24.3	34.2	82.5	74.1	30.6	91.1	96.8	38.0	80.5	0.52	69.9
Henderson	5,731	82.1	32.4	19.8	68.7	49.6	57.5	11.3	92.7	82.3	60.8	72.8	47.5	75.2	0.48	68.4
Gibson	9,317	34.7	23.9	42.5	64.4	94.2	55.4	69.4	55.7	86.6	65.6	47.2	74.5	60.6	0.44	67.0
Union	4,503	88.0	66.4	42.9	71.5	24.3	91.6	43.2	31.1	37.0	97.0	13.3	64.6	64.6	0.41	66.0
Henry	6,226	34.7	50.9	45.7	80.1	53.2	87.8	76.8	31.1	93.2	24.4	51.4	75.5	57.6	0.40	65.4
Campbell	10,089	7.3	43.9	90.8	65.9	38.6	82.8	20.5	30.1	35.3	99.9	67.4	79.9	54.3	0.39	65.1
Monroe	8,971	8.0	71.7	66.5	93.0	27.6	59.6	67.1	43.0	29.3	86.7	82.1	70.6	59.9	0.38	64.9
Cocke	7,849	69.7	55.5	84.3	56.0	86.4	44.6	57.2	31.5	34.8	58.8	61.6	77.1	55.2	0.37	64.4
Sevier	15,957	98.9	26.9	32.5	48.2	20.8	82.8	97.6	47.6	32.3	34.7	24.4	44.9	70.9	0.36	64.0
Bledsoe	2,617	84.6	25.8	84.1	92.7	61.7	44.6	96.2	22.9	28.2	56.9	13.3	82.0	48.8	0.31	62.3
Stewart	2,699	82.1	25.4	49.6	41.1	18.7	55.4	47.9	93.6	41.1	41.9	55.5	36.5	65.2	0.16	56.3
Hawkins	12,061	88.0	40.5	52.5	46.6	16.1	28.5	58.4	59.2	28.7	80.3	55.5	29.0	68.8	0.16	56.3
McNairy	5,621	96.2	50.7	49.9	41.9	23.9	23.2	25.6	69.1	85.2	41.9	24.4	28.2	68.6	0.15	55.8
Grainger	5,032	94.3	35.3	75.3	89.6	23.5	26.6	33.2	12.9	28.5	80.0	53.4	58.2	49.9	0.08	53.0
Hickman	5,030	18.5	32.9	40.3	21.3	53.7	34.2	98.6	63.6	65.3	26.0	59.6	31.8	62.8	0.07	52.6
Coffee	12,369	46.4	45.9	26.6	72.1	62.1	90.8	37.2	71.6	53.9	29.7	37.1	71.2	42.3	0.06	52.5
Weakley	8,056	71.5	38.3	20.2	8.8	45.1	53.2	34.9	34.3	60.2	98.6	31.3	21.8	65.4	0.00	50.2
Hamilton	56,892	17.1	56.6	33.7	59.1	86.4	76.7	58.6	36.2	23.6	51.4	71.0	71.7	38.8	0.00	50.0
McMinn	11,252	48.4	67.4	31.3	41.1	38.6	94.5	25.6	51.7	29.2	64.9	39.0	58.2	43.1	-0.05	47.9
Warren	9,230	98.7	67.6	28.3	59.9	61.2	26.6	28.2	29.5	23.9	61.2	15.7	40.8	51.6	-0.06	47.7
Rhea	7,095	56.5	24.1	48.0	54.5	51.7	98.4	20.5	33.1	31.2	41.9	77.7	78.3	31.9	-0.06	47.6
Marshall	5,671	90.7	41.3	14.8	16.0	81.1	18.6	87.1	47.7	53.6	29.7	19.7	23.7	59.5	-0.09	46.5
Washington	23,462	99.1	27.6	19.3	26.8	37.1	34.2	19.9	64.9	40.3	35.0	53.4	21.9	58.5	-0.13	44.9

The State of The Child



= Highest Well-Being

= Above Average Well-Being

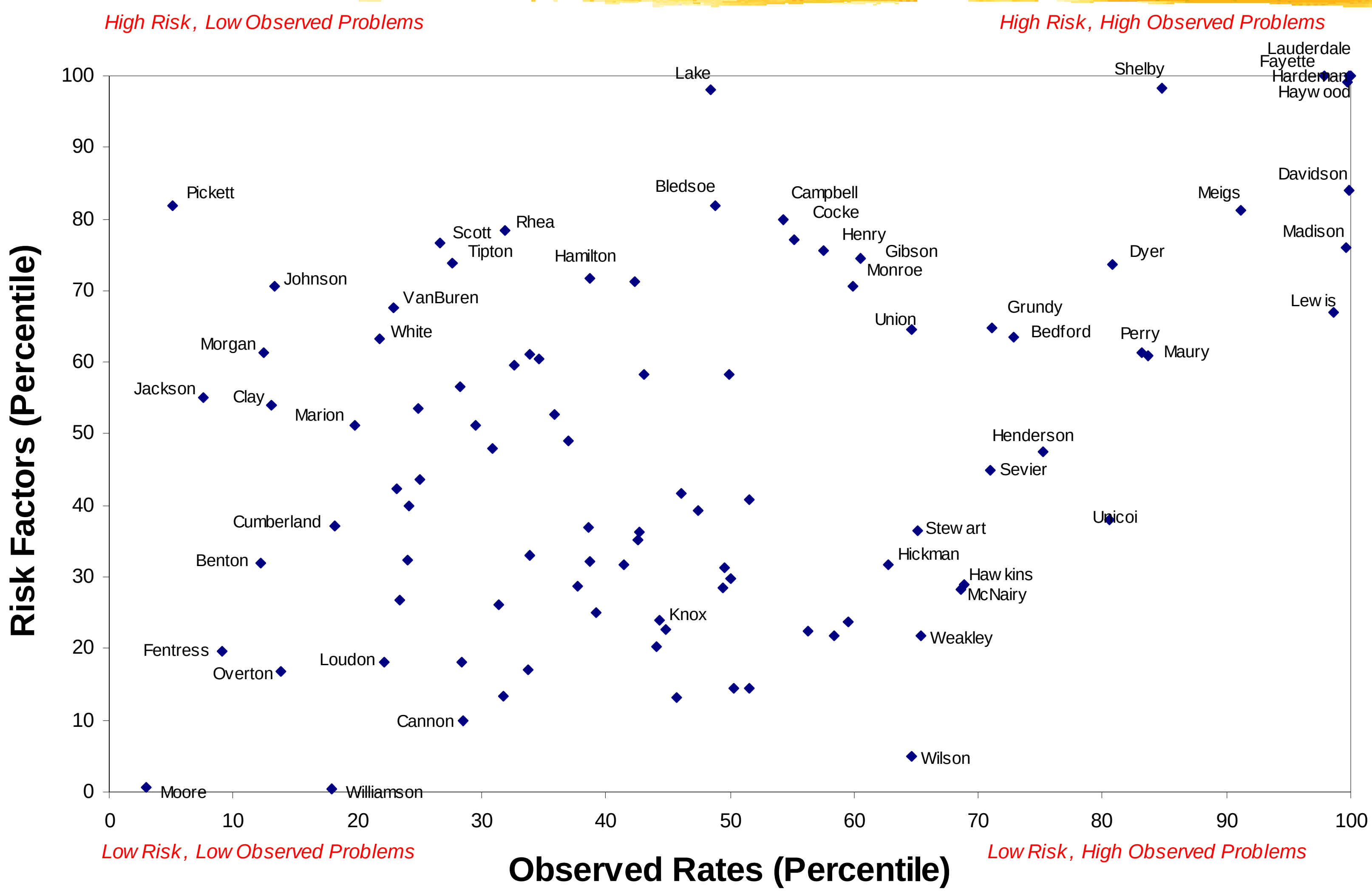
= Below Average Well-Being

= Lowest Well-Being

Note: Be very cautious when interpreting these results. There are many positive and/or negative reasons why counties may appear to be above- or below-average, and these summary results should be used only as the starting place for informed discussions about local and regional needs.

Overall ratings are based on 11 separate indicators, including: Children in free & reduced lunch program; Births to mothers aged 10-17; Births to unmarried parents; Percentage of low birthweight babies; Referrals to juvenile court; Children in state custody; TennCare Partners SED designation; Special education ED certification; Inpatient admissions; School suspension; School dropout rates

Risk Factors vs Observed Problem Rates



Discussion

- What accounts for discrepancy between risk factors and observed problem data for many counties?
  - Under/overutilization
  - Stigma/Inaccurate reporting
  - Protective factors in community
  - Unidentified community stressors

- Findings prompt community awareness/discussion
  - Several needy counties were identified through this process that otherwise may not have received services
  - Stakeholders found this system intuitive and easy to use; this was helpful in terms of justifying funding decisions

General Issues

- Similar process can be extended to nearly any community-level indicator
  - Identify key variables with stakeholders
  - Unweight and convert to Z-scores
  - Sum variable Z-scores to create and overall Z-score
  - Convert overall Z's to overall percentiles
  - Provide findings to stakeholders for use in developing program and funding priorities
  - Revise as needed

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