

# **SCALABILITY OF COMPOSITE INDICES OF WELL-BEING:**

## **THE CASE OF THE CHILD AND YOUTH WELL-BEING INDEX\***

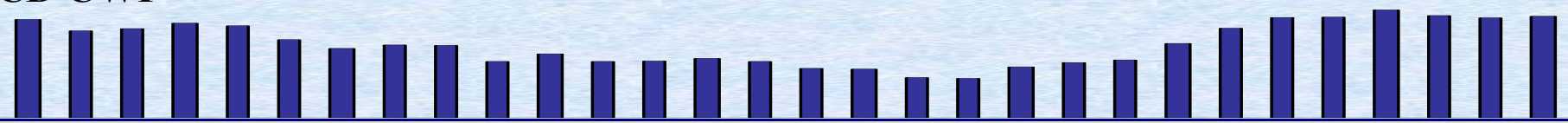
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Italian Association for Quality of Life Studies**

**Workshop Presentation**

**Florence, Italy**

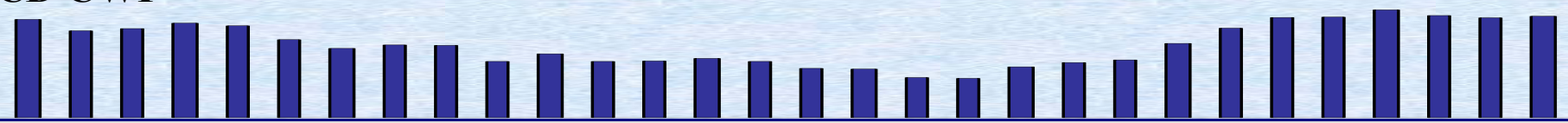
**September 9-10, 2011**

**\*Other members of the CWI Project Team are Vicki L. Lamb, Ph.D., and Qiang Fu, M.A.**



# The Basic Social Indicators Questions

- ✓ How are we doing?
- ✓ With a focus on children, how are the kids (including adolescents and youths) doing?

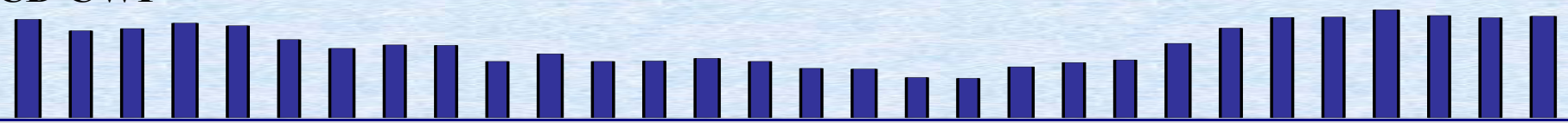


# The Basic Social Indicators Questions

These questions can be addressed by comparisons:

- to *past historical values*,
- to *other contemporaneous units* (e.g., comparisons among subpopulations, states, regions, countries), or
- to *goals or other externally established standards*,

**The Foundation for Child Development Child and Youth Well-Being Index (CWI)**, described below, uses all three points of comparison.



## Some Peer-Reviewed Publications on the CWI

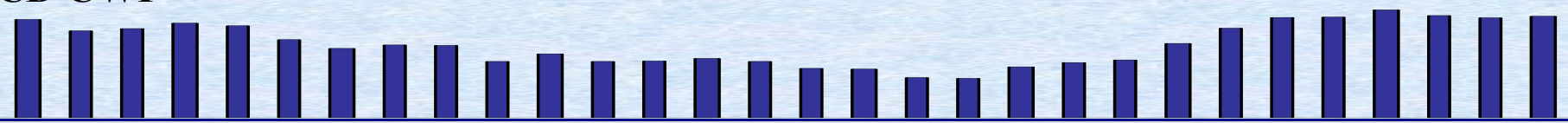
Land, Kenneth C. , Vicki L. Lamb, and Sarah Kahler Mustillo **2001** “Child and Youth Well-Being in the United States, 1975-1998: Some Findings from a New Index,” *Social Indicators Research*, 56, (December):241-320.

Land, Kenneth C. , Vicki L. Lamb, Sarah O. Meadows, and Ashley Taylor **2007** “Measuring Trends in Child Well-Being: An Evidence-Based Approach,” *Social Indicators Research*, 80:105-132.

Hagerty, Michael R. and Kenneth C. Land **2007** “Constructing Summary Indices of Quality of Life: A Model for the Effect of Heterogeneous Importance Weights,” *Sociological Methods and Research*, 35(May):455-496.

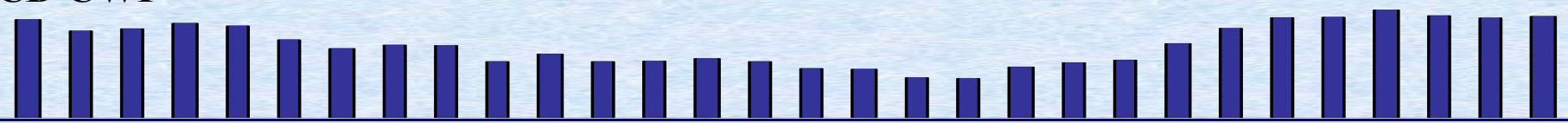
Lee, Joonkoo, Vicki L. Lamb, and Kenneth C. Land **2009** “Composite Indices of Changes in Child and Youth Well-Being in the San Francisco Bay Area and the State of California, 1995-2005,” *Child Indicators Research*, 2(December):353-374.

Land, Kenneth C., Vicki L. Lamb, and Hui Zheng **2011** “How Are the Kids Doing? How Do We Know? Recent Trends in Child and Youth Well-Being in the United States and Some International Comparisons,” *Social Indicators Research*, 100 (January):463-477.



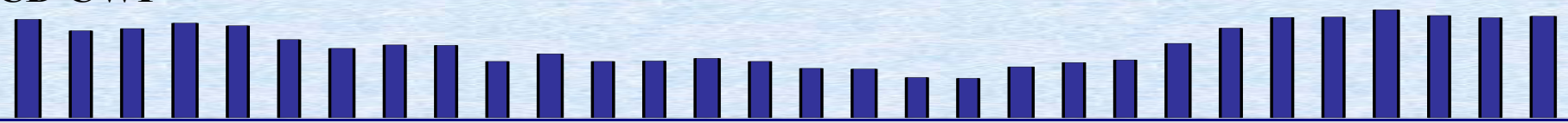
# What is the CWI?

- ❖ A composite measure of trends over time in the quality of life, or well-being, of America's children and young people.
- ❖ It consists of several interrelated summary or composite indices of annual time series of 28 social indicators of well-being.



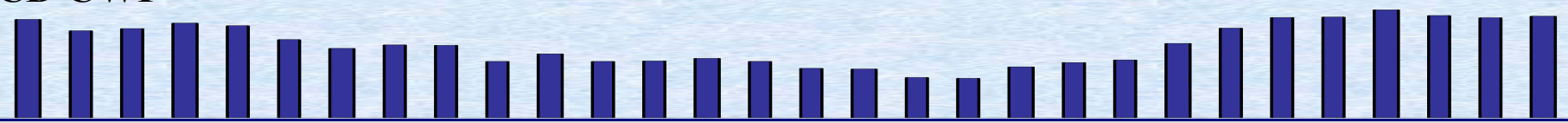
## **The Principal Objective of the CWI:**

To give a sense of the overall direction of change in the well-being of children and youth in the United States as compared to 1975.



## **The CWI is designed to address the following types of questions:**

- ✓ Overall, on average, how did child and youth well-being in the United States change in the last quarter of the 20<sup>th</sup> century and into the present?
- ✓ Did it improve or deteriorate, and by how much?
- ✓ In which domains or areas of social life?



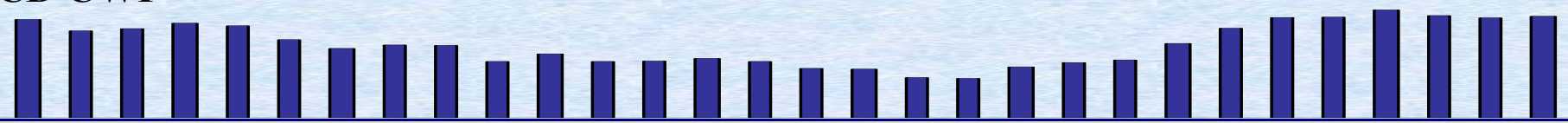
- ✓ For specific age groups?
- ✓ For particular race/ethnic groups?
- ✓ For each of the sexes?
- ✓ And did race/ethnic group and sex disparities increase or decrease?



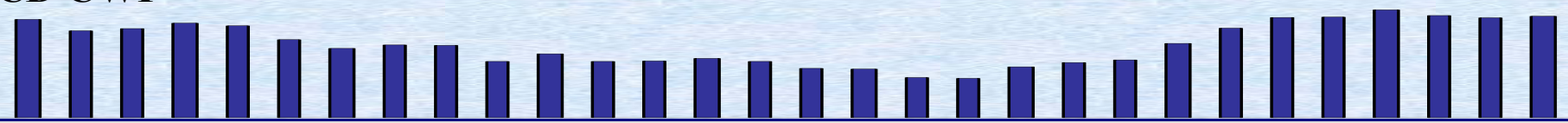


# Methods of Index Construction

- Annual time series data (from vital statistics and sample surveys) have been assembled on some 28 national level indicators in seven well-being/quality-of-life domains:
  - Family Economic Well-Being
  - Health
  - Safety/Risky Behavior
  - Educational Attainment
  - Community Engagement
  - Social Relationships (with Family and Peers)
  - Emotional/Spiritual Well-Being



- These seven domains have been well-established in over two decades of empirical studies of subjective well-being, including studies of children and youths, by social psychologists and other social scientists.
- In this sense, *the CWI is an evidence-based measure of trends in averages of the social and life conditions encountered by children and youths in the United States.*



## **Twenty-Eight Key National Indicators of Child and Youth Well-Being in the United States.**

### ***Family Economic Well-Being Domain***

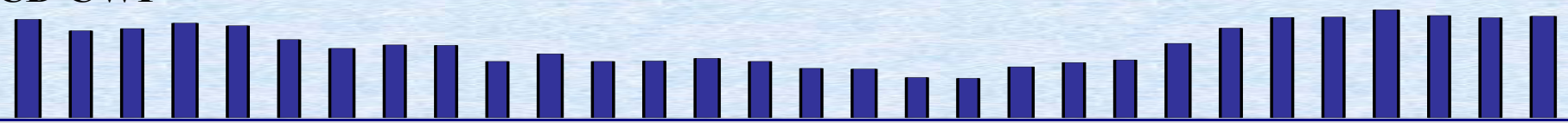
- ✓ Poverty Rate (All Families with Children)
- ✓ Secure Parental Employment Rate
- ✓ Median Annual Income (All Families with Children)
- ✓ Rate of Children with Health Insurance

### ***Health Domain***

- ✓ Infant Mortality Rate
- ✓ Low Birth Weight Rate
- ✓ Mortality Rate (Ages 1-19)
- ✓ Rate of Children with Very Good or Excellent Health (as reported by parents)
- ✓ Rate of Children with Activity Limitations (as reported by parents)
- ✓ Rate of Overweight Children and Adolescents (Ages 6-19)

### ***Safety/Risky Behavior Domain***

- ✓ Teenage Birth Rate (Ages 10-17)
- ✓ Rate of Violent Crime Victimization (Ages 12-19)
- ✓ Rate of Violent Crime Offenders (Ages 12-17)
- ✓ Rate of Cigarette Smoking (Grade 12)
- ✓ Rate of Alcohol Drinking (Grade 12)
- ✓ Rate of Illicit Drug Use (Grade 12)



## **Twenty-Eight Key Indicators, Continued**

### ***Educational Attainment Domain***

- ✓ Reading Test Scores (Ages 9, 13, and 17)
- ✓ Mathematics Test Scores (Ages 9, 13, and 17)

### ***Community Engagement***

- ✓ Rate of Persons who have Received a High School Diploma (Ages 18-24)
- ✓ Rate of Youths Not Working and Not in School (Ages 16-19)
- ✓ Rate of Pre-Kindergarten Enrollment (Ages 3-4)
- ✓ Rate of Persons who have Received a Bachelor's Degree (Ages 25-29)
- ✓ Rate of Voting in Presidential Elections (Ages 18-20)

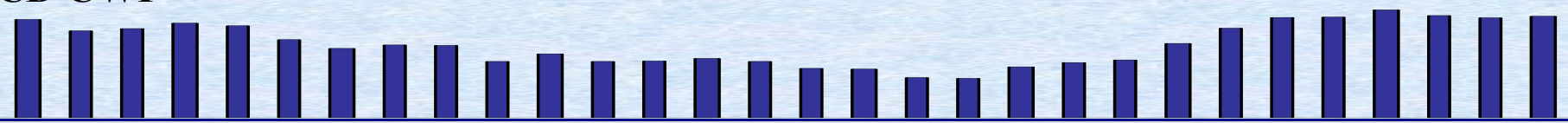
### ***Social Relationships Domain***

- ✓ Rate of Children in Families Headed by a Single Parent
- ✓ Rate of Children who have Moved within the Last Year (Ages 1-18)

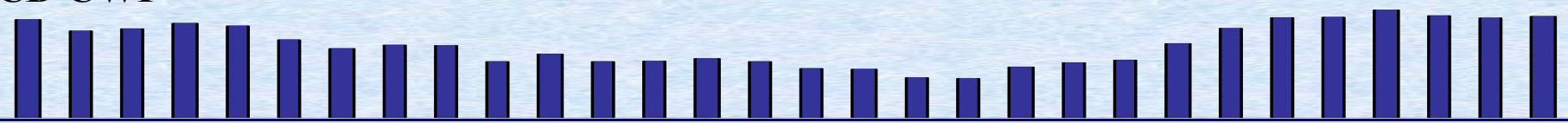
### ***Emotional/Spiritual Well-Being Domain***

- ✓ Suicide Rate (Ages 10-19)
- ✓ Rate of Weekly Religious Attendance (Grade 12)
- ✓ Percent who report Religion as Being Very Important (Grade 12)

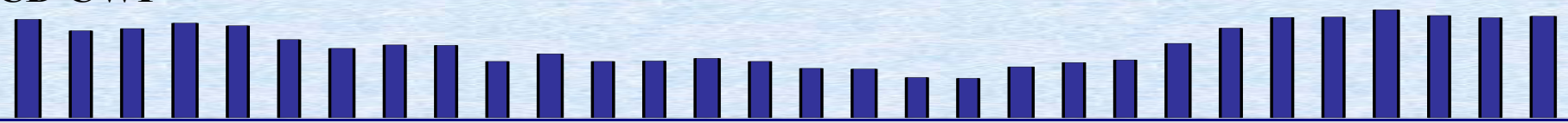
Note: Unless otherwise noted, indicators refer to children ages 0-17.



- Each of the 28 Key Indicators is indexed by percentage change from the base year, 1975.
  - That is, subsequent annual observations are computed as percentage changes from those of the base year.
  - Three indicators begin in the mid-1980s and use corresponding base years.
  - The base year is assigned a value of 100.
  - The directions of the indicator values are oriented such that a value greater (lesser) than 100 in subsequent years means the social condition measured has improved (deteriorated).

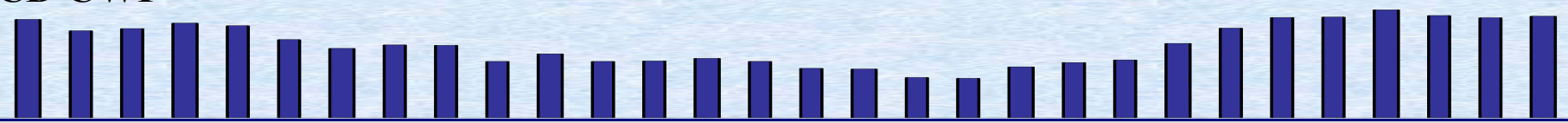


- The time series of the 28 indicators are grouped together into the seven domains described above and domain-specific summary well-being indices are constructed.
  - Within these summary indices, each indicator is equally weighted.
- The seven component indices are then combined into the equally-weighted composite Child and Youth Well-being Index (CWI).



## On Equal Weighting

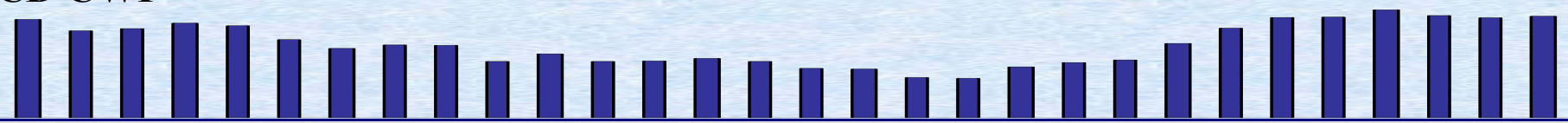
- In an article on statistical methodology, Hagerty and Land (2007) consider the general question of how to construct composite, summary indices for a social unit that will be endorsed by a majority of its members.
- They assume that many social indicators are available to describe the social unit, but individuals disagree about the relative weights to be assigned to each social indicator.
- The composite index that maximizes agree among individuals can then be derived, along with conditions under which an index will be endorsed by a majority in the social unit.



## On Equal Weighting

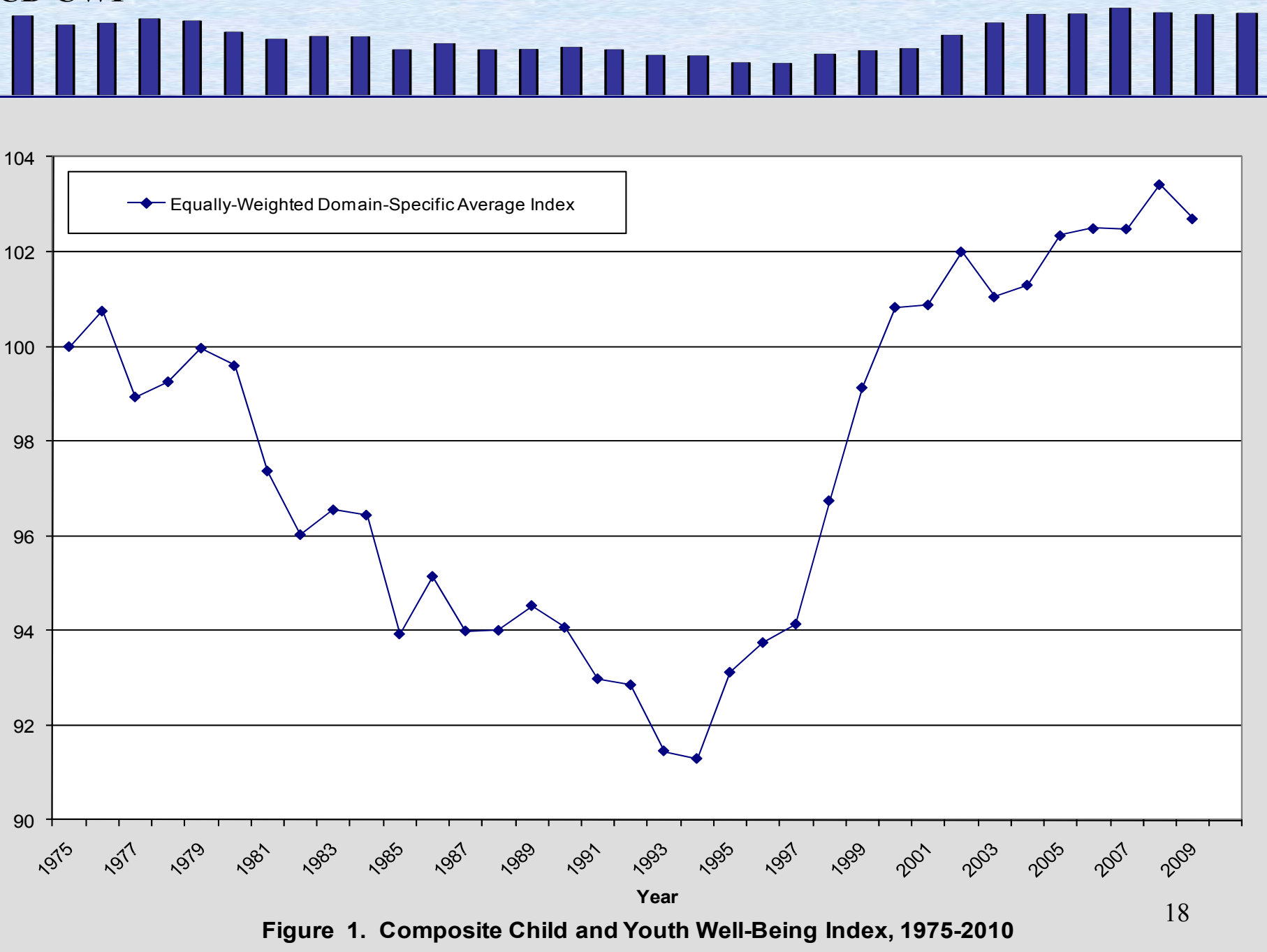
- Using both a theoretical analysis of a statistical model to measure the extent of agreement among individuals and computer simulations, Hagerty and Land (2007) showed that intuition greatly underestimates the extent of agreement among individuals, and that it is often possible to construct a composite index with which most individuals agree (at least in direction).
- In particular, they show that the *equal-weighting strategy* is privileged in that it is what statisticians call a *minimax estimator*—it minimizes disagreement among all possible individuals' weights for the indicators. Hagerty and Land (2007) demonstrate these propositions by calculating real composite quality-of-life indices from two sample surveys of individuals' actual importance weights.



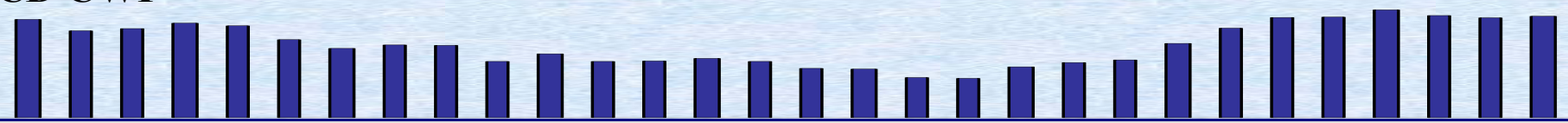


## Some Findings:

# National-Level CWI Trends, 1975-2010



**Figure 1. Composite Child and Youth Well-Being Index, 1975-2010**



## Some Findings:

# National-Level Domain-Specific Indices, 1975-2010

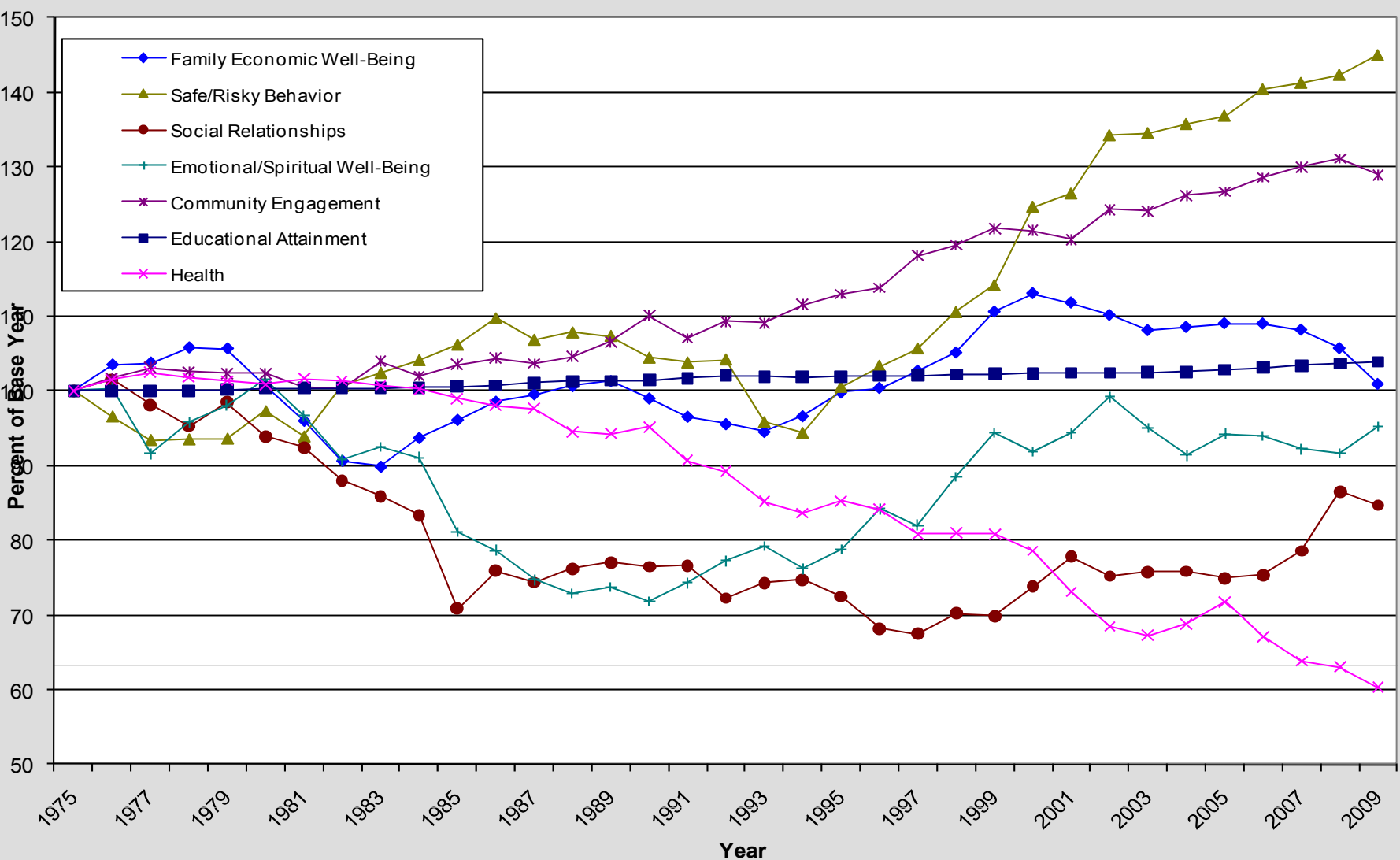
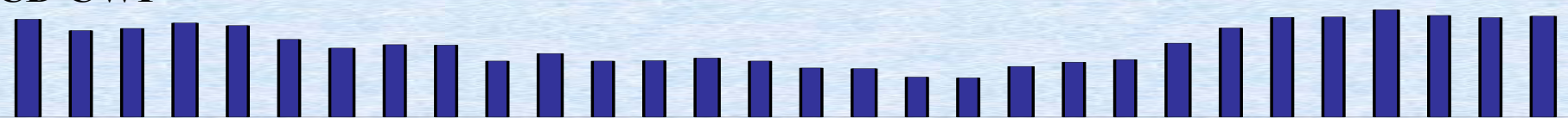
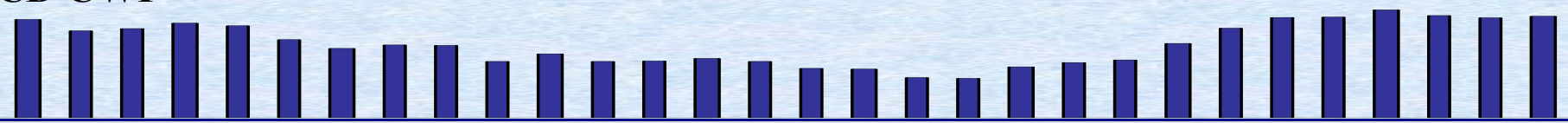


Figure 2. Domain-Specific Summary Indices, 1975-2010

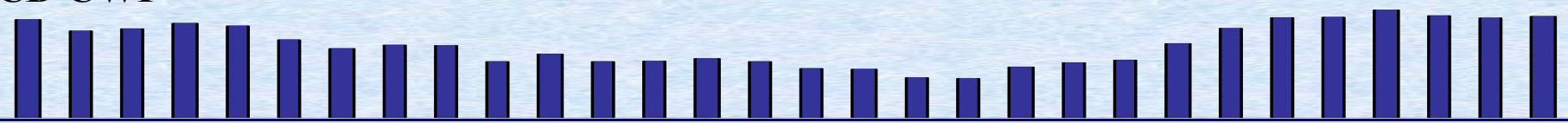


## **The Question of the Day:**

Granted that the CWI has been well-established as a composite index of trends in child and youth well-being at the national level in the U.S.:

**Is the CWI scalable?**

**That is, can CWI well-being concepts, indicators, domains of well-being, and composite indices be applied and interpreted at sub-national levels?**

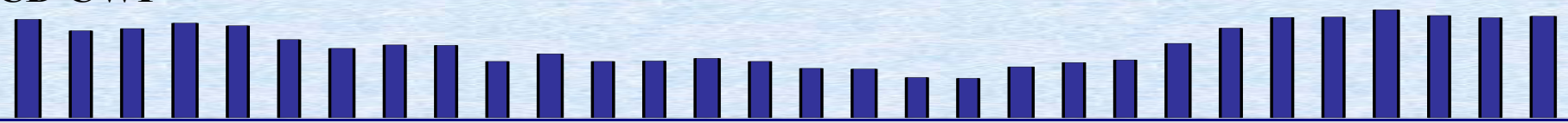


## **A Sub-National CWI Study:**

To address this question, we studied trends, changes and projections for child and youth well-being in:

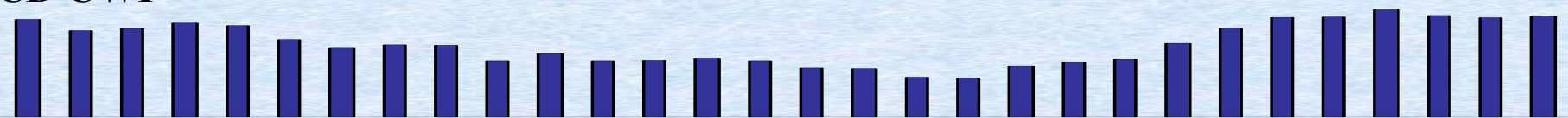
- 1) the State of California,
- 2) the San Francisco Bay Area, and
- 3) Los Angeles County

by constructing CWIs for each of these geographic areas and measuring well-being changes in a comparable way to the national CWI.



**Table 1. Sixteen Key Indicators of Child and Youth Well-Being in the San Francisco Bay Area, Los Angeles County, and the State of California.**

Domain	Indicator	Definition
<i>Family economic well-being domain:</i>	Children in poverty	Percentage of children ages 0 – 17 in households earning less than the federal poverty level
	Households that can afford to purchase a median-priced home	Percentage of households that can afford to purchase a median-priced home
<i>Safe/risky behavior:</i>	Teen birth rate	Number of births per 1,000 girls ages 15–19
	Juvenile felony arrest rate	Number of juvenile felony arrests per 1,000 youth ages 10–17
	Juvenile felony drug and alcohol arrest rate	Number of juvenile felony drug and alcohol arrests per 1,000 youth ages 10–17



## Table 1, Continued

*Health domain:*

Infant mortality rate

Number of deaths per 1,000 live births.

Infants born at low birth weight

Percentage of infants born at low birth weight, which is defined as less than 2500 grams.

Child/youth death rate

Number of deaths per 100,000 children/youth ages 1 – 24

Injury hospitalization rate

Number of non-fatal injury hospitalizations per 100,000 children/youth ages 0–20

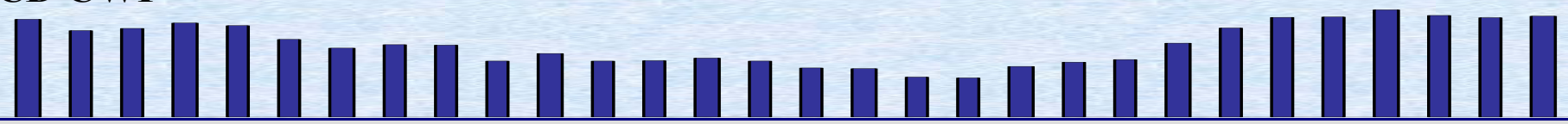
Asthma hospitalization rate

Number of asthma hospitalizations per 1,000 individuals at ages 0–14

Women receiving prenatal care in the first trimester

Percentage of women who receive prenatal care in the first trimester of pregnancy



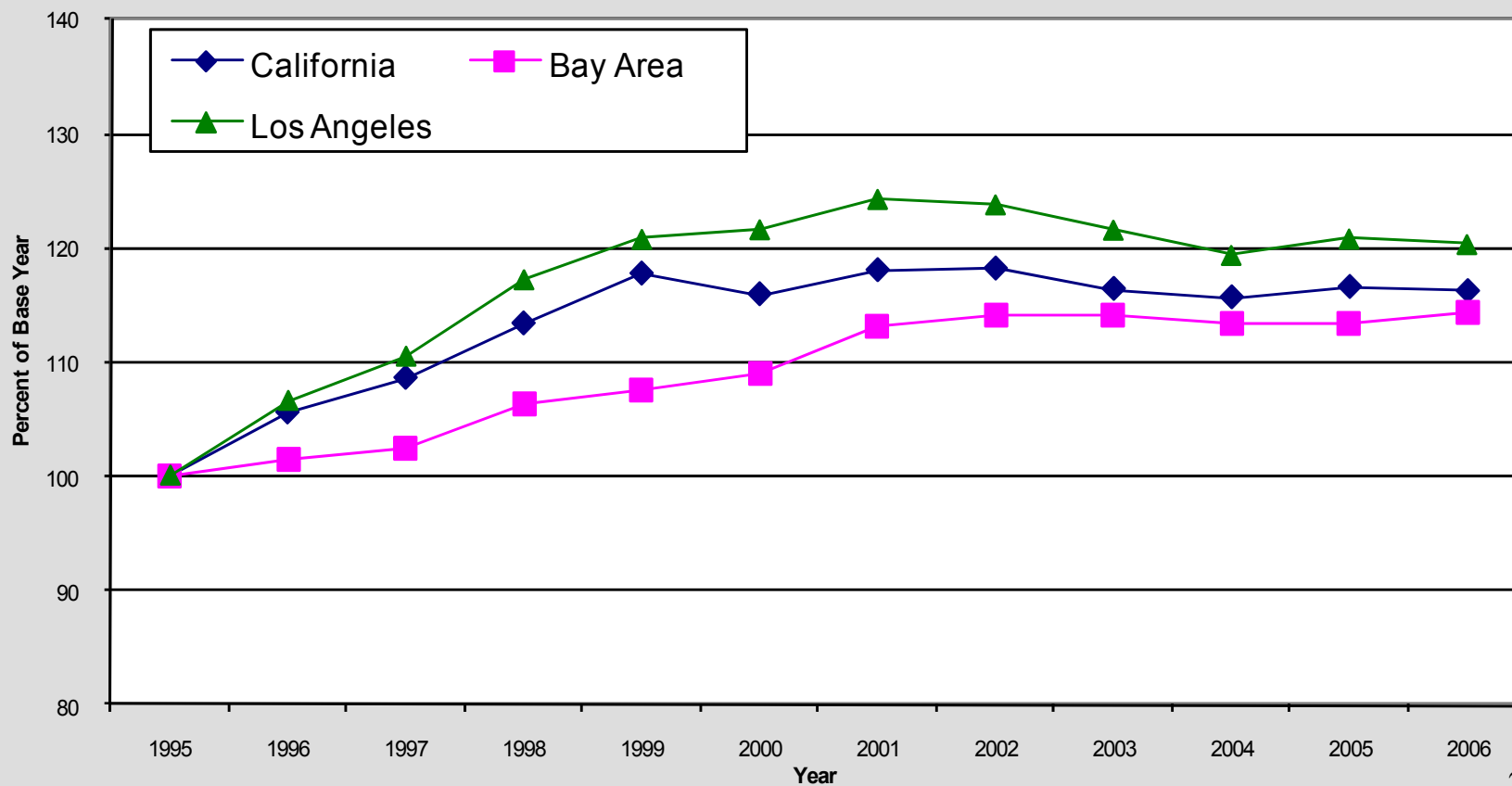


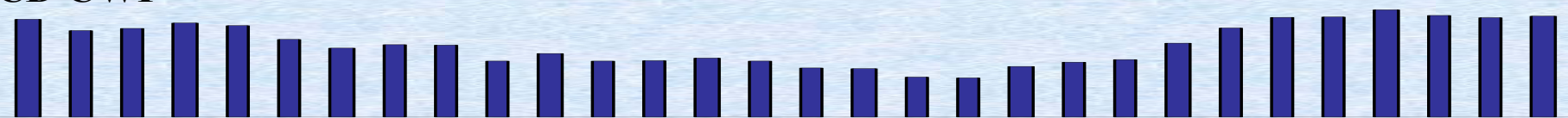
# Table 1, Continued

Educational attainment/community engagement	High school graduates completing college preparatory courses	Percentage of public school 12th grade graduates completing course required for University of California (UC) and/or California State University (CSU) entrance, with a grade of "C" or better
	High school dropouts	Estimated percentage of public high school students who drop out of high school, by race/ethnicity, according to the four-year derived dropout rate, which is an estimate of the percentage of students who would drop out in a four-year period based on data collected for a single year
	Children with access to child care	Percentage of children ages 0–13 with parents in the labor force who have access to licensed child care
Emotional well-being domain:	Youth suicide rate	Number of suicides per 100,000 youth age 15–24
	Self-inflicted injury hospitalization rate	Rate of non-fatal self-inflicted injury hospitalizations per 100,000 children/youth ages 5–20

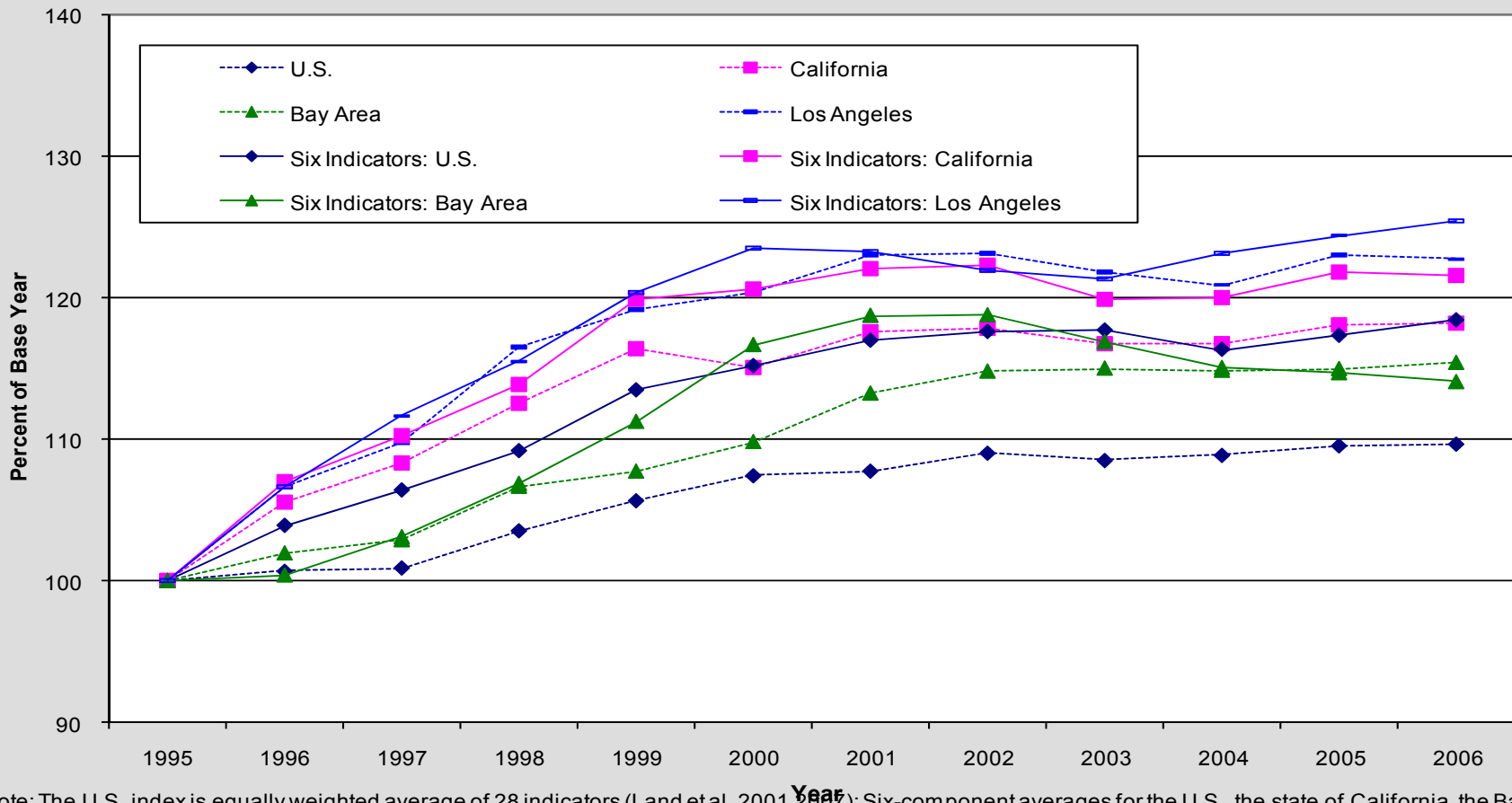
# Some Findings:

Figure 3. Composite Child and Youth Well-Being Index, California, Bay Area and Los Angeles, 1995-2006

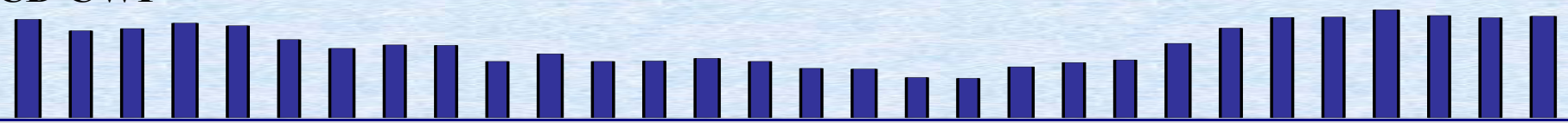




**Figure 4. Comparison of Child and Youth Well-Being Index, U.S., California, Bay Area and Los Angeles, 1995-2006**



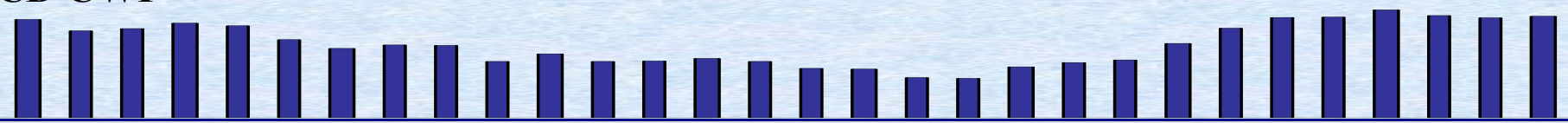
Note: The U.S. index is equally weighted average of 28 indicators (Land et al. 2001, 2007); Six-component averages for the U.S., the state of California, the Bay Area and Los Angeles are based on six indicators that closely match to the national CWI: children poverty, infant mortality rate, infants born at low birth weight, child/youth death rate, teen birth rate, and youth suicide rate.



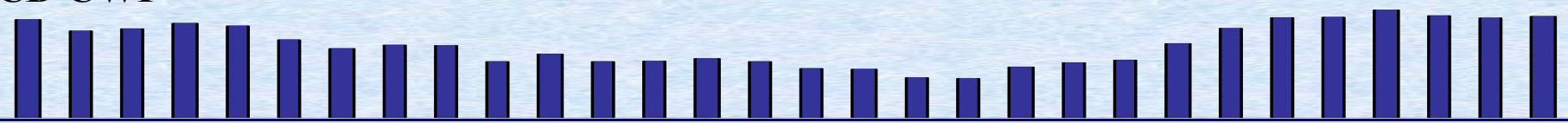
**The following major findings resulted from these**

**analyses:**

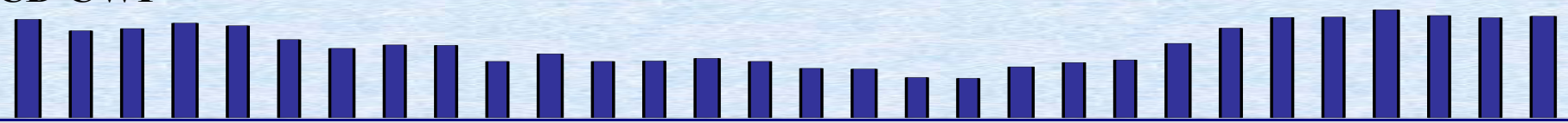
- 1) Overall Child and Youth Well-Being:** Steadily improved during the decade from the mid-1990s to the mid-2000s in all three units of analysis, the State of California, the San Francisco Bay Area, and Los Angeles County.



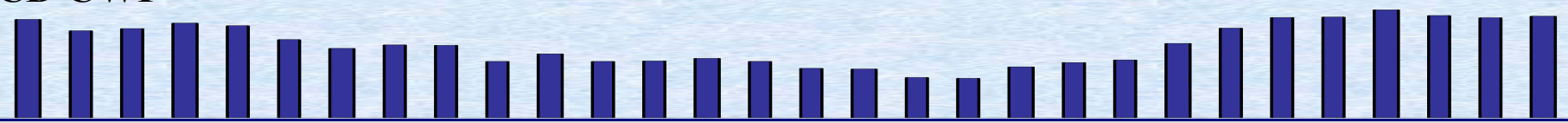
2) **Gender Disparities:** With respect to our overall composite measures of levels of well-being, Disparity CWI analyses showed that girls had an enduring advantage over boys during the time period studied. Girls' sustained advantage over boys in health and educational attainment/community engagement in recent years resulted in a persistent gender gap in well-being in all three areas, although their advantage in emotional well-being was reversed in the Bay Area and considerably decreased in California after 2003.



3) **Gender-Specific Improvements in Well-Being:** In terms of the rate of improvement in overall well-being, boys made much more progress relative to a 1995, compared to girls. Note, however, that the generally higher level of girls' well-being means that further gains are more difficult to achieve which may account for their relatively moderate improvement.

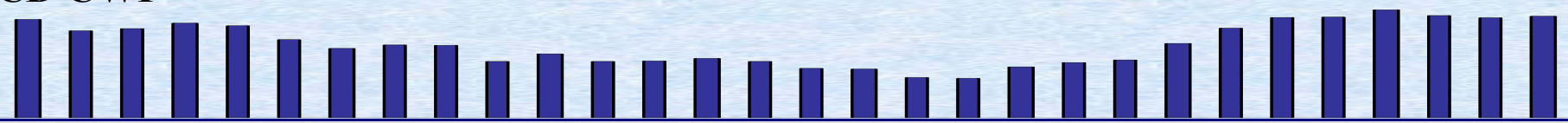


4) **Race-Ethnic-Specific Trends:** All groups studied – African Americans, Asians, Latinos, and Caucasians – showed improvements in well-being. The upward trend of African Americans' CWI reversed after 2001, making them fall behind the other race/ethnic groups. In terms of well-being levels, Disparity CWIs show that gaps in well-being among racial and ethnic groups persisted over time. Boys and girls, and children in different race/ethnic groups generally showed similar trends across most of the well-being domains. The safe/risky behavior domain recorded the highest in the rate of improvement, followed by education attainment and health. One domain that made a difference across the groups is emotional well-being. Suicide and self-inflicted injury hospitalization rates vary considerably by gender and in different race and ethnic groups.

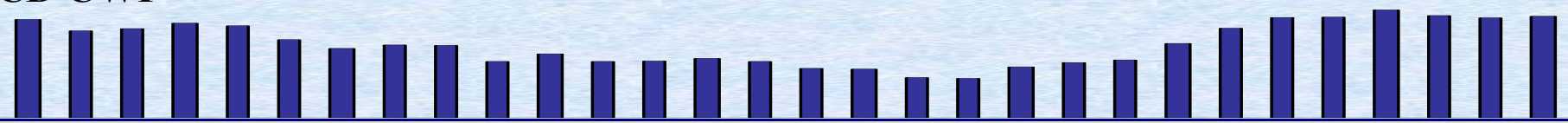


**5) Direct Impacts of the Great Recession, 2008-2009:** Our projections on the rates of children in poverty point to an increasing trend for the years 2008 through 2010 for all three regions. Los Angeles County has the largest projected levels of child poverty over the period. It is expected to increase from 21.4 to around 35 percent between 2007 and 2012, whereas the trend for California was projected to increase from 17.3 to 27.3 percent over the same period. The Bay Area has the lowest projected levels of children in poverty overall and the smallest increase between 2007 and 2010. For all three regions, child poverty is projected to decline after 2010.



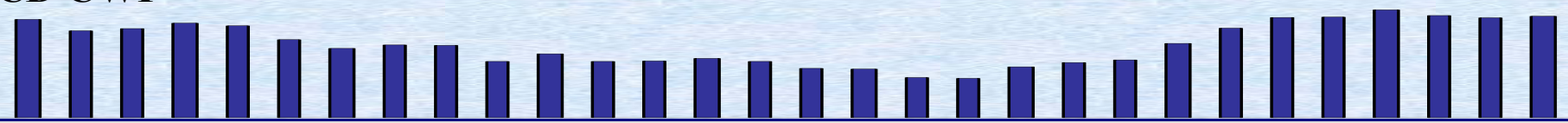


**6) Secondary Impacts of the Great Recession:** In addition to these direct impacts of Great Recession, it is expected that there will be secondary or indirect impacts on child and youth well-being in the three focal regions that correspond to impacts expected at the national level. Specifically, it is anticipated that there will be adverse impacts on indicators in the health, safe/risky behavior, educational attainment/community engagement, and emotional well-being domains.



## CONCLUSIONS

- This study of the CWI suggests that composite indices of changes in well-being are scalable – that they can be applied at, and compared across, levels of aggregation below the national level.
- Such analyses can reveal differences in trends among the units being compared – local variation – that can be related to levels of development and other areal differences.
- The primary limitation to estimation and analysis of composite indices at the sub-national level is data availability.



# The CWI on the Web:

<http://www.soc.duke.edu/~cwi/>