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## **MEASURING THE PERFORMANCE OF CRIMINAL HISTORY RECORDS SYSTEMS: The Records Quality Index**

### **Abstract**

This report describes the on-going development, testing, validation and implementation of a Records Quality Index (RQI) by Structured Decisions Corporation (SDC). The purpose of the RQI is to measure the performance of criminal history records systems and to assist the Bureau of Justice Statistics (BJS) to (i) assess the status of records quality at both the state and national levels; (ii) identify critical records improvement activities by pinpointing areas of deficiency; and (iii) target specific state- and local-level problems and deficiencies in future National Criminal History Improvement Program (NCHIP) funding cycles.

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# **MEASURING THE PERFORMANCE OF CRIMINAL HISTORY RECORDS SYSTEMS: The Records Quality Index**

**January 2005**

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## Highlights

This report describes the on-going development, testing, validation and implementation of a Records Quality Index (RQI) by Structured Decisions Corporation (SDC). The purpose of the RQI is to measure the performance of criminal history records systems and to assist the Bureau of Justice Statistics (BJS) to (i) assess the status of records quality at both the state and national levels; (ii) identify critical records improvement activities by pinpointing areas of deficiency; and (iii) target specific state- and local-level problems and deficiencies in future National Criminal History Improvement Program (NCHIP) funding cycles. The work is funded by the Bureau of Justice Statistics, U.S. Department of Justice.

- Based on analysis of the first nationwide data collection cycle, and in cooperation with the states' criminal history record repositories, a Records Quality Index (RQI) has been developed and refined. The RQI has been shown to be an effective gauge of the performance of state criminal history records systems. Comprised of a set of well-defined outcome and process measures, the RQI reflects goals of the federal records improvement programs, and describes the progress with which these goals are being achieved.
- The computed state RQI cannot be less than zero and has no upper limit. For 1993, the RQI ranged from 0 to 234 (with a *median* of 35.4); for 1997, the RQI ranged from 0 to 338 (with a *median* of 112.2); and for 2001, the RQI ranged from 8 to 785 (with a *median* of 178.6). With few exceptions – due primarily to large arrest fingerprint card and/or disposition backlogs at the repository – the state RQIs increased over time.
- From 1993 to 1997, the median percent RQI increase was 78.5%; from 1997 to 2001, the median percent RQI increase was 77%.
- Of course, states with an RQI of zero have considerable room for improvement. It is noteworthy that in 1993 there were eleven such states, whereas in 1997 there were only two and in 2001 there was none.
- The National Records Quality Index (NRQI) – comprised of a weighted average of state RQIs – increased from 56.2 in 1993 to 202.0 in 2001. This is a direct result of increases in the individual state RQIs brought about by federally-funded improvements to state criminal history records systems.

## What is the RQI?

Development of the RQI is part of BJS's ongoing efforts to measure improvements in criminal records occurring as a consequence of federal funds awarded to states under the NCHIP<sup>1</sup> and the Five Percent Set-Aside of the Edward Byrne Memorial State and Local Law Enforcement Assistance Grant Program<sup>2</sup>.

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<sup>1</sup> NCHIP implements the grant provisions of: the Crime Identification Technology Act of 1998; the Brady Handgun Violence Prevention Act; the National Child Protection Act of 1993; certain provisions of the Omnibus Crime Control and Safe Streets Act of 1968 and the Violent Crime Control and Law Enforcement Act

Much as the Dow Jones Index of 30 bell-weather stocks gauges the performance of the entire stock market, a criminal history records quality index – based on a small set of key measures – characterizes the performance of a large-scale criminal history records system. At the request of BJS, SDC – national evaluators of the federally-funded criminal history records improvement programs – developed the RQI to enhance BJS’s ability to monitor system performance across jurisdictions and over time and to help identify areas for improvement in future years.

BJS is using the RQI as a barometer of performance to (i) assess the status of records quality at both the state and national levels; (ii) identify critical records improvement activities by pinpointing areas of deficiency; and (iii) help BJS target problems and deficiencies in future NCHIP funding cycles. The President’s Budget for 2004 included the RQI as a key performance measure for tracking state records improvements and targeting federal funding more effectively.

### **How was the RQI developed?**

Development of the RQI required consideration of three things:

- (1) Criteria for including measures in the index;
- (2) The relative quality of the individual measures that would comprise the index; and,
- (3) The connection of the chosen measures to the common performance goals of federal criminal history record improvement programs.

The first step, then, in developing the RQI was to identify a set of relevant criteria. These criteria in turn helped identify a manageable set of primary indicators for assessing the performance of criminal history records systems from which the RQI’s mathematical structure was evolved. The criteria included:

- C1. The individual measures which constitute the state RQIs must address the common goals of federal criminal history records improvement programs and their respective underlying legislative mandates (Exhibit 1).
- C2. To the extent possible, these individual measures should possess desirable data quality or measure attributes (Exhibit 2).
- C3. Since it is not practical to formally carry out a major evaluation or assess a large number of measures on a continual basis, a small set of key measures which can characterize the overall performance of the system must be identified; further, their combination into an index could be employed to continuously ascertain the performance of the system.

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of 1994; relevant requirements of the Jacob Wetterling Crimes Against Children and Sexually Violent Offender Registration Act, Megan’s Law and the Pam Lychner Sexual Offender Tracking and Identification Act of 1996; and the Victims of Trafficking and Violence Protection Act of 2000.

<sup>2</sup> The Byrne Formula Grant Program was created by the Anti-Drug Abuse Act of 1988. The Crime Control Act of 1990 required that states spend at least 5% of their annual Byrne formula grant funds on improving the quality of their criminal history records. According to the Bureau of Justice Assistance (BJA), the Justice Assistance Grant (JAG) Program, which waives the 5% set-aside, has received Congressional approval.

- C4. To cover the broad spectrum of data quality issues embraced by the six common goals, it is necessary to employ both basic and derived measures; derived measures (e.g., averages, percentages) are those that combine two or more basic measures. It is critical that all derived measures start from their constituent basic measures and be derived as part of the RQI development process. In other words, only the raw data required to compute the basic measures should be requested from the states.
- C5. To the extent feasible, the individual measures which constitute the state RQIs should be chosen to facilitate their annual collection, so as to establish a time series for determining changes in the RQI since the advent of the federally-funded records improvement programs in the early 1990s.
- C6. Like other national indices (e.g., Dow Jones, Consumer Prices, FBI’s Uniform Crime Reports, etc.), the RQI should be bounded below (by zero) but should not have an upper bound; that is, the index should be one that can grow indefinitely with no maximum value or saturation point – otherwise, the component parts of the RQI would remain fixed and no new quality improvement programs could become part of the RQI measurement process.
- C7. Indeed, in order to make the RQI an updatable and continuous index, it is critical that as new outcome or process measures are included in the RQI, they do not cause discontinuities in the computed RQI values.

*Exhibit 1 Common Goals of Federally-Funded Records Improvement*

Goal	Federal Records Improvement Focus
1	<b>Provide Required Resources</b> – Provide resources required to establish the necessary infrastructure for improving criminal history records and related systems
2	<b>Improve Records Quality</b> – Improve the quality (i.e., the completeness, accuracy, timeliness and accessibility) of criminal history records.
3	<b>Improve Reporting</b> – Improve interstate, intra-state and federal criminal history records-related reporting.
4	<b>Automate Systems</b> – Automate systems for creating, storing, and sharing criminal history records.
5	<b>Identify Ineligible Firearm Purchasers</b> – Identify persons ineligible, for criminal and non-criminal justice reasons, to purchase firearms.
6	<b>Identify Disqualified Care Providers and Other Applicants</b> – Identify individuals disqualified from caring for children, elderly and disabled; identify persons ineligible for other sensitive positions or permits.

### *Exhibit 2 Desirable Attributes of RQI Measures*

Attribute	Impact on Measures
1. Understandability	Are the pertinent measures <i>well-defined</i> and specific? Are they <i>easy-to-interpret</i> and <i>hard-to-dispute</i> ?
2. Measurability	Are the measures, in fact, <i>measurable</i> ? Can they be <i>quantified</i> ?
3. Availability	Are the pertinent measures <i>available</i> ? Are they easy to obtain?
4. Consistency	Are the states <i>consistent</i> in the way they define a particular measure? (For example, the percentage of arrests within the past 5 years that have dispositions recorded is interpreted conservatively – i.e., charge-based – in some states, while liberally – i.e., arrest-based – in other states.)
5. Validity	Are the measures sufficiently grounded to be deemed <i>valid</i> ? Are basic measures in the form of raw data used to derive more complex measures? (For example, are the number of felony arrest cases disposed <u>and</u> the number of disposed felony arrest cases received by the repository used to determine the percentage of disposed felony arrest cases received by the repository?)
6. Reliability	Are the measures obtained in one period or setting statistically the same as those obtained in another period or setting?
7. Stability	Are measures derived from two or more other measures (e.g., percentages, averages) subject to <i>instability</i> (i.e., a change in the derived measure cannot be explicitly attributed)? (For example, an increase in the percentage of statewide felony arrests reported to the repository could be due to an increase in the number reported or a decrease in the number of arrests.)
8. Accuracy	Are the reported statistics <i>accurate</i> – have they been checked, double-checked, or perhaps even triple-checked?
9. Independence	Is comparative assessment of state data quality improvements based upon <i>independent</i> measures? (For example, the lack of fingerprint support for arrest records and membership in III would not be independent measures, since the former automatically precludes the latter.)
10. Robustness	Are the pertinent measures <i>robust</i> in scope? (Averages are not robust because they fail to capture the underlying variability in data; quantile measures may be preferred since they provide a better understanding of inherent variability.)
11. Completeness	Do the selected measures cover the range of data quality issues?

#### *RQI measures structure*

After considerable research and analysis, SDC determined that the RQI for a particular state should be a function of: (a) a set of outcome measures; (b) a timeliness measure; and (c) a completeness measure. In mathematical terms, then, the RQI takes the following form:

$$1. \text{ RQI}(s) = K * O(s) * P_2(s) / P_1(s)$$

where,



- $O(s)$  is a *weighted* sum of  $N$  outcome measures,  $O(s) = [a_1O_1(s) + a_2O_2(s) + \dots + a_NO_N(s)]$ ;  $0 \leq O_i(s) \leq 1$ ; currently,  $N = 10$  and  $a_i = 1/N$  for  $i = 1, 2, \dots, N$ .
  - $P_1(s)$  is a *normalized and censored* process measure that reflects the average elapsed time between arrest and final disposition for all arrests that can be linked to at least one disposition for state  $s$ ;  $P_1(s) > 0$ , and  $P_1(s)$  has no upper limit; thus  $RQI(s)$  is unbounded.
  - $P_2(s)$  is a disposition-based process measure that reflects the “cohort” completeness of records (e.g., the fraction of 1991 arrests that have posted final dispositions by the end of 1993).
  - $K$  is an appropriate scaling factor; currently,  $K = 100,000$ .
  - The underlying outcome and process measures of the RQI collectively satisfy to a large extent, the seven identified criteria.
2. The national RQI, NRQI, is a weighted average of the individual state RQIs, where the weights are reflective of the number of criminal history records in each state. Thus, the NRQI is of the form:

$$NRQI = w(1)*RQI(1) + w(2)*RQI(2) + w(3)*RQI(3) + \dots + w(53)*RQI(53)$$

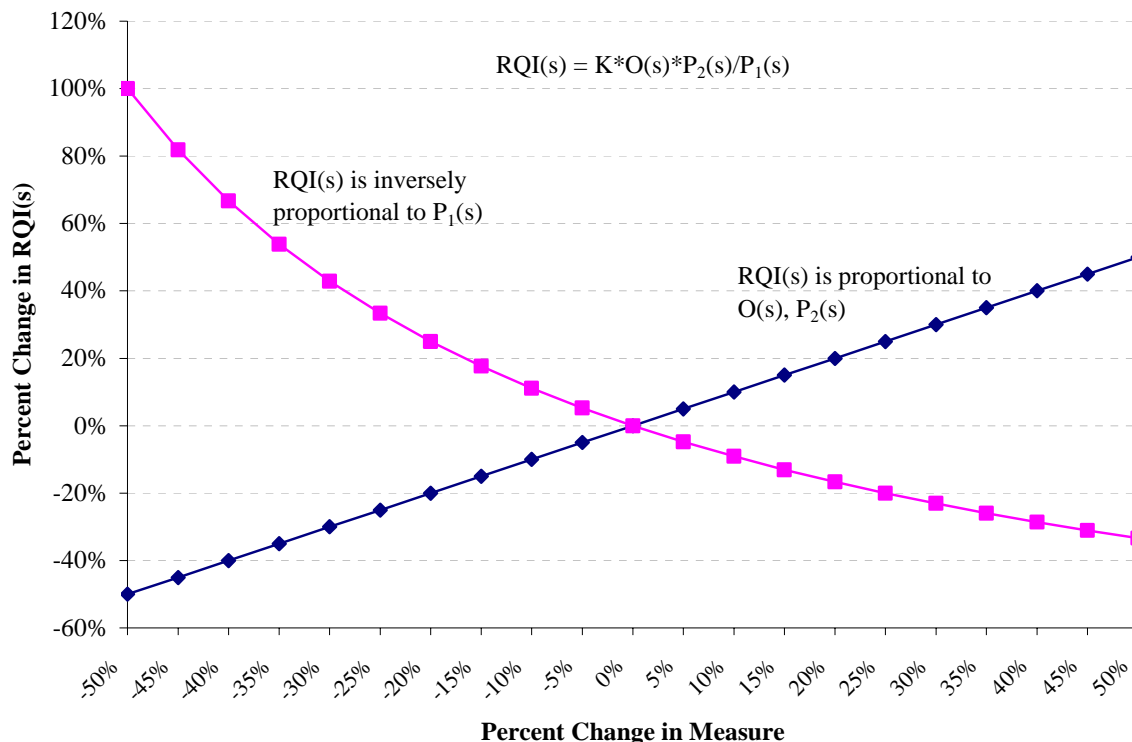
where,  $w(s)$  = weight of state  $s$  = ratio of number of criminal history records in state  $s$  to number of records nationwide; currently,  $s = 53$ .

The  $RQI(s)$  is sensitive to changes in  $O(s)$ ,  $P_1(s)$ , and  $P_2(s)$  (Exhibit 3). Since  $RQI(s)$  is proportional or linear with respect to both  $O(s)$  and  $P_2(s)$ , a 20% increase, for example, in a state's  $O(s)$  or  $P_2(s)$ , leads to a corresponding 20% increase in its  $RQI(s)$ <sup>3</sup>. On the other hand,  $RQI(s)$  is inversely proportional to  $P_1(s)$  so a 20% decrease in a state's  $P_1(s)$  results in a 25% increase in its  $RQI$ <sup>4</sup>. Finally, it is worth noting that the inclusion of additional measures in the RQI serves not only to better define the RQI but also to differentiate among the computed state RQIs.

<sup>3</sup> To see how  $RQI(s)$  changes as  $P_2(s)$  changes, suppose that state  $s$  has an initial  $RQI(s)$ , called  $RQI^a$ , based on an initial  $P_2(s)$ , called  $P_2^a$ . Now suppose that the value of  $P_2^a$  changes by  $x\%$  to yield  $P_2^b$ . Then,  $P_2^b = (1+.01x)P_2^a$ . The percent change in the RQI is given by:  $100*[RQI^b - RQI^a]/RQI^a = 100*[P_2^b - P_2^a]/P_2^a = 100*[(1+.01x)P_2^a - P_2^a]/P_2^a = 100*[(1+.01x) - 1] = x$ . Similarly,  $RQI(s)$  is linearly impacted by changes in  $O(s)$ . Thus, a 20% increase in  $P_2(s)$  (i.e.,  $x = 20$ ) results in a 20% increase in  $RQI(s)$ .

<sup>4</sup> To see how  $RQI(s)$  changes as  $P_1(s)$  changes, suppose that state  $s$  has an initial  $RQI(s)$ , say  $RQI^a$ , based on an initial  $P_1(s)$ , say  $P_1^a$ . Now suppose that the value of  $P_1^a$  changes by  $x\%$  to yield  $P_1^b$ . Then,  $P_1^b = (1+.01x)P_1^a$ . Since  $RQI(s)$  is inversely proportional to  $P_1(s)$ , the percent change in the RQI is given by:  $100*[RQI^b - RQI^a]/RQI^a = 100*[(1/P_1^b) - (1/P_1^a)]/(1/P_1^a) = 100*P_1^a [(1/P_1^b) - (1/P_1^a)] = 100*[(P_1^a/P_1^b) - (P_1^a/P_1^a)] = 100*(P_1^a - P_1^b)/P_1^b = 100*[P_1^a - (1+.01x)P_1^a]/(1+.01x)P_1^a = 100*[1 - (1+.01x)]/(1+.01x) = 100*[-.01x/(1+.01x)] = -x/(1+.01x)$ . Thus, a 20% decrease in  $P_1(s)$  (i.e.,  $x = -20$ ) results in a 25% increase in  $RQI(s)$  (i.e.,  $[-(-20)/(1-.01*20)] = [20/(1-.2)] = (20/.8) = 25$ ).

**Exhibit 3 RQI Sensitivity to  $O(s)$ ,  $P_1(s)$  and  $P_2(s)$**



*RQI outcome measures*

To begin the selection of RQI measures, SDC conducted an extensive literature review of existing records quality measures, including those identified by SEARCH, REJIS, BJS (i.e., National Judicial Reporting Program) and NCSC (i.e., Court Statistics Project). It turned out, however, that most of the measures cited in the literature were either not basic or not sufficiently pertinent to the RQI. Moreover, while the focus of the RQI is on data quality, virtually all published public-sector performance measures are budget-focused. For this reason, SDC defined an initial set of outcome measures, and worked closely over several months with BJS and with ten representative pilot test states – California, Georgia, Maryland, Minnesota, Missouri, New Jersey, North Carolina, Oregon, Texas, and Virginia – to better define and refine the measures. Ultimately, ten (10) outcome measures were identified. Exhibit 4 identifies each measure, describes how it is computed, and specifies the basic state data required.

### Exhibit 4 RQI Outcome Measures

O <sub>i</sub> (s)	RQI Measure	Scoring Schema	Required Basic Data
O <sub>1</sub> (s)	What proportion of the records in your criminal history database are <i>fully automated</i> – i.e., records for which the master name index and entire criminal history are automated?	Decimal fraction of criminal history records which are fully automated	Number of manual and automated records; number of fully automated records
O <sub>2</sub> (s)	What proportion of your criminal history records in III are indexed with SIDs (State Identification Numbers) pointing to your state – i.e., the number of records for which your state responds to III inquiries?	III participant = decimal fraction of III records for which state is responsible; Non III participant = 0.0	State's III status; number of persons with criminal records in state's III; number of records for which state is responsible
O <sub>3</sub> (s)	What proportion of your arrests – including both fingerprints and arrest information – are communicated to the repository via an automated interface? <b>Note:</b> Neither faxed transmissions nor data received via livescan, printed out and entered qualifies as automated.	Decimal fraction of annual arrests reported via an automated interface to repository	Number of reported annual arrests; number reported via an automated interface
O <sub>4</sub> (s)	Does your criminal history database flag <i>subjects</i> with convictions for: a. Felony offenses? b. Domestic violence misdemeanors? c. Sex offenses? d. Child abuse offenses? e. Elderly abuse offenses? f. Disabled abuse offenses?	Sum of scores: a. All (0.4)/Most (0.3)/About Half (0.2)/Some (0.1)/None (0.0) b. All (0.2)/Most (0.15)/About Half (0.1)/Some (0.05)/None (0.0) c. All (0.1)/Most (0.07)/About Half (0.05)/Some (0.03)/None (0.0) d. All (0.1)/Most (0.07)/About Half (0.05)/Some (0.03)/None (0.0) e. All (0.1)/Most (0.07)/About Half (0.05)/Some (0.03)/None (0.0) f. All (0.1)/Most (0.07)/About Half (0.05)/Some (0.03)/None (0.0)	Specification of flagged subjects in CCH
O <sub>5</sub> (s)	What proportion of your criminal fingerprints submitted to the FBI are transmitted electronically to the FBI's IAFIS?	Decimal fraction of annual criminal fingerprints submitted to the FBI that are transmitted electronically	Number of criminal fingerprints submitted annually to the FBI; number transmitted electronically
O <sub>6</sub> (s)	What proportion of your applicant fingerprints submitted to the FBI are transmitted electronically to the FBI's IAFIS?	Decimal fraction of annual applicant fingerprints submitted to the FBI that are transmitted electronically	Number of applicant fingerprints submitted annually to the FBI; number transmitted electronically
O <sub>7</sub> (s)	Do you electronically submit data to the: a. National Protection Order File? b. National Sex Offender Registry? c. Mental Defectives/Commitments File? d. Controlled Substance Abuse File? e. Denied Persons File? (Point-of-Contact states only)?	Sum of scores: For POC States: a. All (0.2)/Most (0.15)/About Half (0.1)/Some (0.05)/None (0.0) b. All (0.4)/Most (0.3)/About Half (0.2)/Some (0.1)/None (0.0) c. All (0.1)/Most (0.07)/About Half (0.05)/Some (0.03)/None (0.0) d. All (0.1)/Most (0.07)/About Half (0.05)/Some (0.03)/None (0.0) e. All (0.2)/Most (0.15)/About Half (0.1)/Some (0.05)/None (0.0)  For Non-POC States: a. All (0.2)/Most (0.15)/About Half (0.1)/Some (0.05)/None (0.0) b. All (0.4)/Most (0.3)/About Half (0.2)/Some (0.1)/None (0.0) c. All (0.2)/Most (0.15)/About Half (0.1)/Some (0.05)/None (0.0) d. All (0.2)/Most (0.15)/About Half (0.1)/Some (0.05)/None (0.0)	Specification of databases to which state contributes data
O <sub>8</sub> (s)	What proportion of the court dispositions reported to the repository are communicated via: a. An automated interface? b. Magnetic tape transfer? c. Other means (mail, fax etc.)?	Decimal fraction of court dispositions so reported and weighted by: a. Automated interface = 1.0 b. Magnetic tape transfer = 0.5 c. Other means = 0.0	Number of court dispositions reported to repository; number reported by each means
O <sub>9</sub> (s)	What proportion of the following state files do authorized users have direct automated access to: a. Protection orders? b. Sex offender registry? c. Mental health information relevant to firearms eligibility? d. Drug abuse information relevant to firearms eligibility?	Sum of scores: a. All (0.3)/Most (0.2)/About Half (0.15)/Some (0.1)/None (0.0) b. All (0.3)/Most (0.2)/About Half (0.15)/Some (0.1)/None (0.0) c. All (0.2)/Most (0.15)/About Half (0.1)/Some (0.05)/None (0.0) d. All (0.2)/Most (0.15)/About Half (0.1)/Some (0.05)/None (0.0)	Specification of databases accessed
O <sub>10</sub> (s)	a. Is your state an NFF state? b. Has your state signed the National Crime Prevention and Privacy Compact?	Sum of scores: a. NFF = 0.75 b. Signed = 0.25	Specification of whether state is NFF and/or Compact signed

#### RQI process measures

Process measures reflect a criminal history records system's actual performance in terms of, say, timeliness and completeness. They can identify symptoms, not necessarily underlying causes, of data quality problems; thus, poor arrest/disposition linkage is usually a symptom of a structural problem (e.g., pertinent tracking numbers have not been entered on the arrest/disposition record).

#### Timeliness measure, P<sub>1</sub>(s)

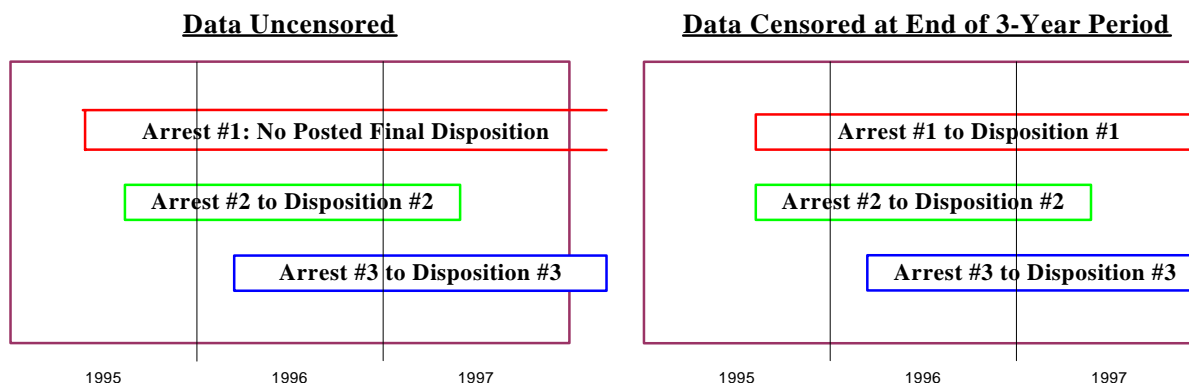
An appropriate timeliness measure is the average time from arrest to final disposition posting in the Computerized Criminal History (CCH) in, say, a three-year period. Since states have different mandates as to which arrests must be submitted to their repositories, to obtain comparable data from state-to-state it would be desirable to restrict the arrests to felonies only, which are more consistently defined. For comparability, data should be collected based on calendar, rather than fiscal, years.

During the pilot phase of RQI development, SDC learned several lessons which framed the formulation of  $P_1(s)$ . First, not all states are able to distinguish felonies from misdemeanors; as a consequence,  $P_1(s)$  would have to include misdemeanor, as well as felony, arrests.

Second, although measuring the average elapsed time from arrest to disposition *posting* in the CCH, rather than disposition *rendering*, is very desirable, SDC discovered during the pilot test that reliable basic data on which to base time from disposition to posting is not usually available – pilot state CCHs do not capture time of posting or time of receipt of disposition. As a result, SDC has been developing a model-based approach to estimating posting times from multiple CCH snapshots and is looking into which state CCHs, if any, have posting dates which can be used to validate the developed model.

Third, arrests for which there is no disposition in the record pose a special problem. Although this could be due to missing data or an undisposed and/or unlinked case, from the user’s point of view it doesn’t matter since in either case the arrest is missing a linked disposition. For the purpose of the RQI, this means that in analyzing the elapsed time from arrest to disposition for arrests occurring in the three-year period 1995-1997, some arrests may not be finally disposed until after 1997, i.e., outside of the specified time period. The result is that the last three-year period for which the RQI is being computed in any data collection cycle would have an abbreviated average elapsed time from arrest to disposition, since no disposition dates would be known after the time period. To control for this, SDC *censored* the data; that is, to maintain period-to-period consistency, SDC treated an arrest whose disposition occurred *after* a specific three-year period as though the disposition occurred on the *last day* of the three-year period. An example of censoring  $P_1(s)$  for 1997 illustrates the concept (Exhibit 5).

**Exhibit 5 Example of Data Censoring for Computing  $P_1(s)$**



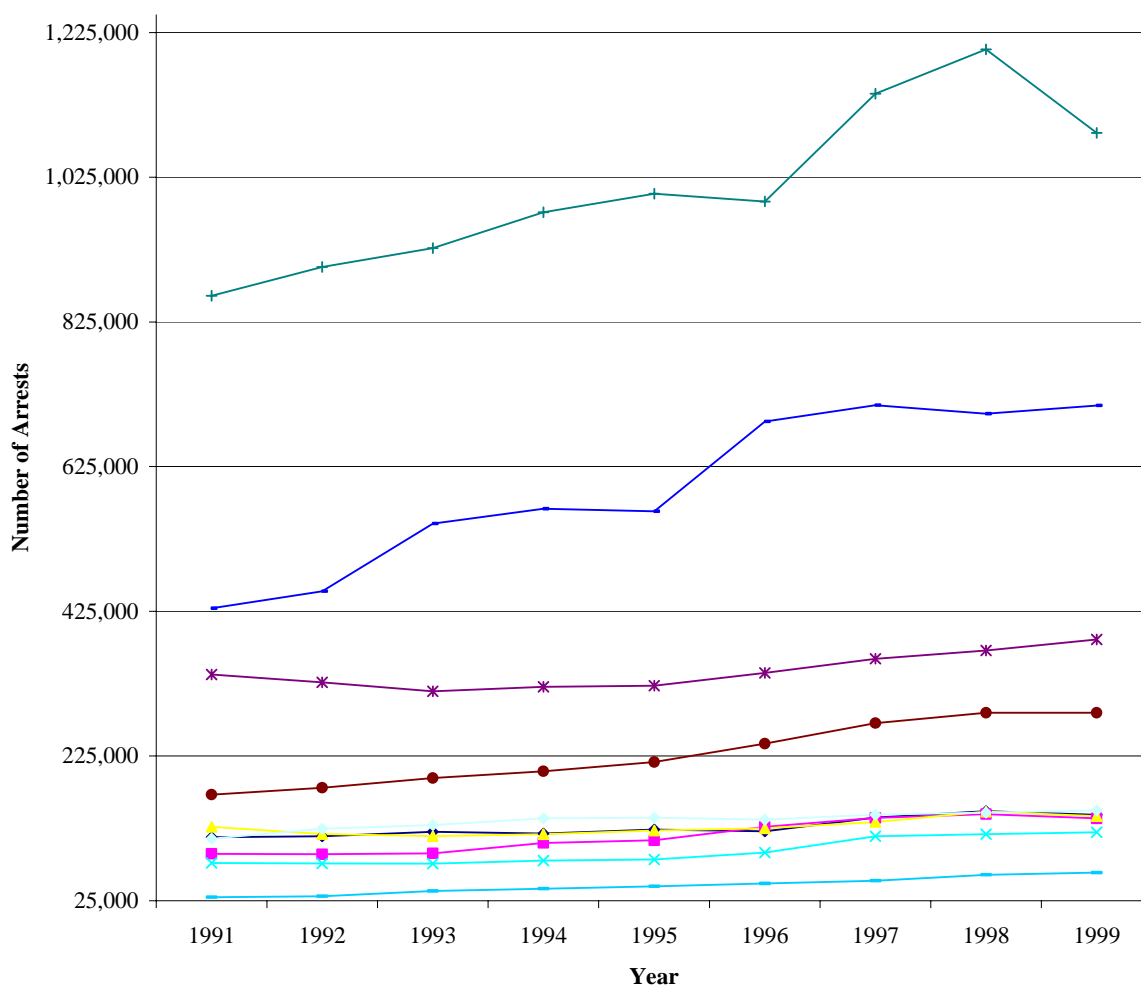
Fourth, the CCH data that SDC acquired from the ten pilot states showed that, in general, there is a steady growth in arrest – and therefore disposition – volumes over time (Exhibit 6). High arrest volumes usually lead to court congestion which adversely impacts raw elapsed times from arrest to disposition. To control for the arrest volume variability over time, SDC *normalized* (i.e., divided) the average elapsed times by a volume-related factor. An appropriate normalizing factor is the ratio of the arrest volume in the measurement three-year period to the arrest volume in the base, or initial, three-year period (which BJS and SDC agreed would be 1991-1993).

Therefore, the arrest-based process measure  $P_1(s)$  can be defined as follows:

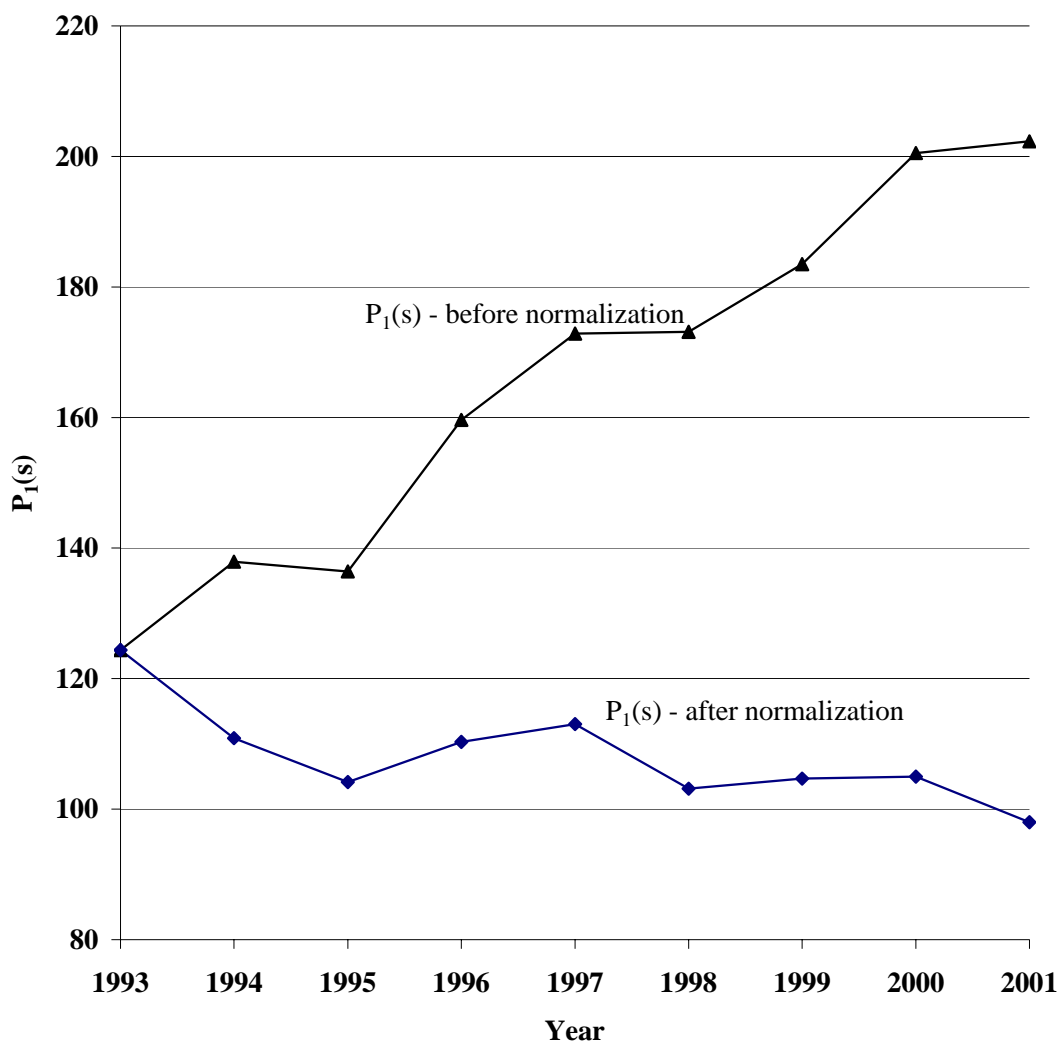
- $P_1(s)$  is a normalized and censored process measure that reflects the average elapsed time between arrest and rendered final disposition for all arrests that can be linked to at least one disposition for state  $s$ ;  $P_1(s) > 0$  and  $P_1(s)$  has no upper limit;  $P_1(s)$  for year  $N$  reflects arrests occurring in the three years;  $N$ ,  $N-1$ , and  $N-2$ .

As a hypothetical example, suppose one wants to compute  $P_1(s)$  for state  $s$  for 1997. Further, suppose that, based on the state's arrest and disposition dates, the average time between an arrest and its rendered final disposition for arrests occurring in the 1995-1997 period is computed to be 173 days. If the arrest volume in 1995-1997 (i.e., the measurement period) is 88,319 and the arrest volume in 1991-1993 (i.e., the base period) is 57,752, then the normalizing factor is  $88,319/57,752 = 1.53$ . So for 1997,  $P_1(s) = 173 \text{ days}/1.53 = 113.1 \text{ days}$ . In other words, the value of  $P_1(s)$  before normalization is 173 days while the value of  $P_1(s)$  after normalization is 113 days.  $P_1(s)$ , before and after normalization respectively, is illustrated (Exhibit 7).

**Exhibit 6 Arrest Volumes By Year For Pilot States**



*Exhibit 7  $P_1(s)$  Before and After Normalizing For a Pilot State*



Completeness measure,  $P_2(s)$

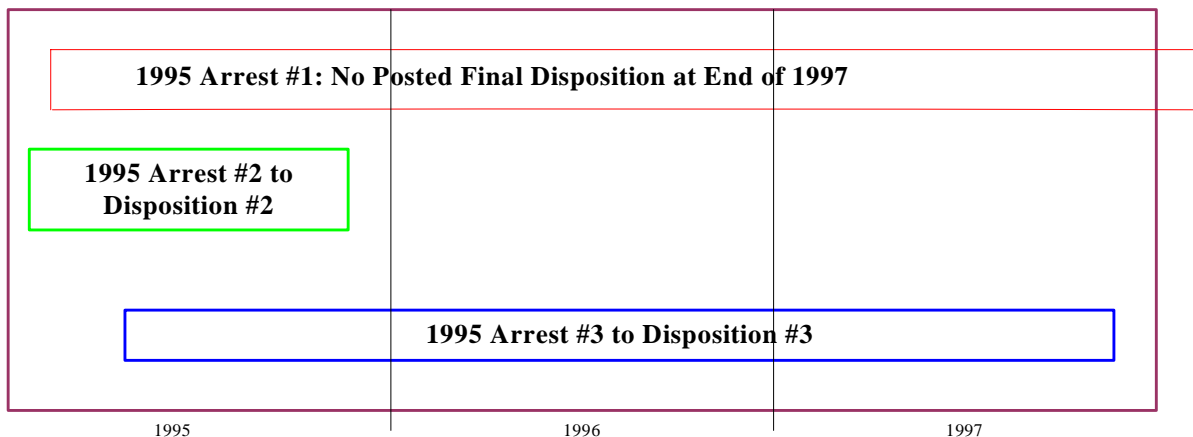
Traditionally, completeness has been thought of in terms of a “snapshot” of the record repository, i.e., what fraction, as of a specific date, of all arrests in the repository has dispositions? A more meaningful approach to measuring completeness is to consider a cohort of arrests; i.e., arrests made in the same time period. With this in mind, SDC defined the process measure,  $P_2(s)$ , as follows:

- $P_2(s)$  is a disposition-based process measure that reflects the “cohort” completeness of records. For year N,  $P_2(s)$  reflects the fraction of calendar year N-2 arrest records that have final dispositions rendered and posted in the repository database by the end of calendar year N.

An example of  $P_2(s)$  for 1997 is shown (Exhibit 8); in this trivial example,  $P_2(s) = 2/3 = 0.67$ . Specifically, the computation of  $P_2(s)$  is based on the same CCH data extract of arrest and corresponding disposition dates SDC utilizes to compute  $P_1(s)$ . As an example, suppose one

wants to measure  $P_2(s)$  for 1997 and, based on the state's CCH data, the number of 1995 arrests is 90,077 and the number of 1995 arrests that have posted final dispositions by the end of 1997 is 68,123. Then  $P_2(s) = 68,123/90,077 = 0.756$ .

**Exhibit 8 Example of  $P_2(s)$**

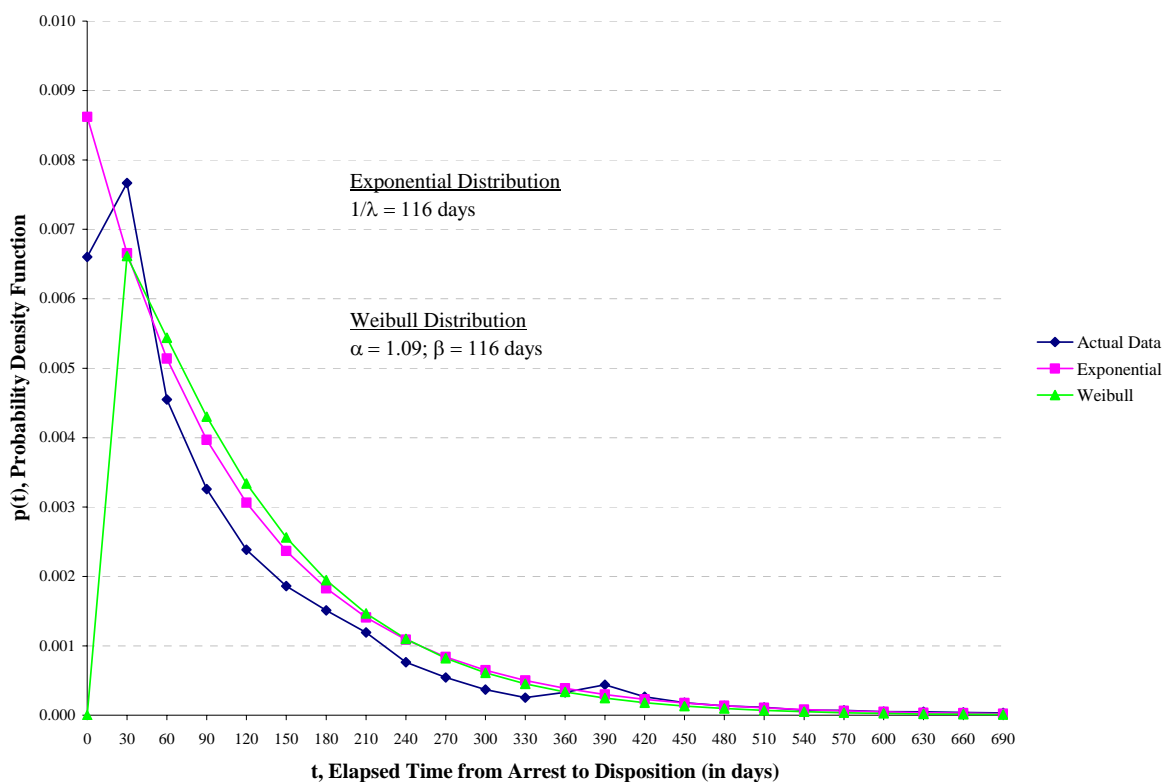


*RQI process measures—required data*

To compute  $P_1(s)$  and  $P_2(s)$ , each state was asked to create an extract of its CCH containing just two data fields: (i) date of arrest and (ii) date of final disposition, for all arrests reported in the 11-year period from January 1, 1991 through December 31, 2001. The start date was chosen to capture data from the period just preceding the NCHIP grant awards. SDC will collect data on an annual basis after 2001; thus, contributing to an RQI time series for each state. For RQI purposes, an arrest is considered to be “finally disposed” when at least one charge has a final disposition. If no final disposition is available, SDC asked the state to leave the field blank. If the state’s criminal history records had not yet been automated in January 1991, the state created the extract beginning with the date on which they were first automated. If the state tracked individual charges, they substituted charges for arrests in the extract and notified SDC of the substitution. In this case, the data fields would become: (i) date of arrest *charge* and (ii) date of final disposition of arrest *charge*, if available.

A number of interesting observations emerged from the pilot phase. First, in all pilot states, the distribution of elapsed time from arrest to disposition is nearly exponential; in fact, the Weibull distribution is an excellent approximation (Exhibit 9) based on the chi-square goodness-of-fit test. Second, in several pilot states, the disposition date precedes the arrest date in as many as 1% of all arrests; a data entry error probably occurred in these cases. For a given state, the percentage of such errors is fairly consistent from year to year. Third, the percentage of undisposed arrests for a given year ranges from 5% to 45%. With only one exception, the percentages are fairly consistent for each state from year to year.

### *Exhibit 9 Distribution of Elapsed Time From Arrest To Disposition*



#### **How is the RQI being implemented?**

To minimize the information reporting burden on the states and to facilitate efficient data collection, SDC developed a Web-based instrument accessible on a password-protected basis. (A sample RQI Web form may be viewed at [www.sdcorp.net/RQI/SampleForm.jsp](http://www.sdcorp.net/RQI/SampleForm.jsp).) Each state was issued a user ID and password; to assist in completing the form, every question had a “pop-up box” containing instructions for providing the data. States were also given the option to download the helpful PDF file of “Frequently Asked RQI Questions”. Additionally, the form was designed to accept partial submissions, retaining all pre-existing entries each time it is re-opened. States provided outcome measures data for 1993, 1997 and 2001 only; as noted earlier, in future years, data will be furnished on an annual basis so as to create an RQI time series for each state. Additionally, states furnished the CCH data extracts necessary to compute  $P_1(s)$  and  $P_2(s)$  on a CD-ROM.

As expected, not all the data SDC requested were available; for example, some states track a requested measure now but did not in the past or do not know what practice was followed in previous years. In other instances, some states track a requested measure but the data are reported as “not known”. Still, at other times, a state may never have tracked a requested measure.

In a data collection effort of this magnitude, data irregularities are to be expected. In all states, it was necessary to “clean out” data anomalies (e.g., a disposition date which precedes its corresponding arrest date) from the CCH extract. As noted earlier, it was also necessary to normalize  $P_1(s)$  to control for arrest volume variability and censor  $P_1(s)$  for consistency from period to period. SDC resolved data anomalies, such as incomplete datasets, on an



individual state basis by using statistically appropriate techniques such as estimation or sampling. For example, one state provided a sample of arrests and dispositions when it was determined that their underlying CCH data file was unusable. They did this by filtering out records where one or both dates was known to be flawed and including only those records in which both the arrest date and final disposition date were deemed reliable. In another state, a programmer had accidentally deleted a number of known disposition dates from the CCH. Instead of the dates, the affected records contain “flags” indicating that a disposition date exists. These appeared to be random but were never recovered because the state knows the disposition outcome and reasoned that if anyone needed the date, it could be obtained directly from the court. Since SDC had no reason to believe that there was a systematic bias in these unknown dates,  $P_1(s)$  was as usual computed utilizing those records with dates and ignoring those with flags only. Three other examples of potentially problematic datasets are presented (Exhibit 10). In each case, careful consideration of the data was required and a discussion of the problem with state officials at the repository and/or courts resulted in a satisfactory resolution.

### *Exhibit 10 Examples of Data Problems and their Resolution*

State	Data Problem	Explanation	Resolution
A	How to calculate $P_1(A)$ and $P_2(A)$ prior to 2000	State A's legacy CCH, in use until January 2000, did not store disposition dates as a separate field. The dates, if they were in the database at all, were embedded in a free text field, making it difficult to extract them.	State A gave us 3 fields for the 1990-1999 data: 1. date of arrest; 2. date of disposition if it's a legacy arrest with a disposition received after 1/1/2000; or 3. the free text legacy disposition field (which may or may not include the date). Upon receipt of data, SDC extracted the disposition dates wherever possible and examined the data closely to determine whether $P_1(A)$ and $P_2(A)$ can be estimated using SDC's developed simulation model.
B	How to calculate $P_1(B)$ and $P_2(B)$	State B's CCH does not track disposition dates. Upon reviewing a court data dictionary, SDC discovered that both the arrest date and disposition date are in the court records and, at first, SDC thought that using the court records would solve the problem. However, it turns out that the courts have the disposition date but do not have most of the arrest dates. The repository's arrest dates and the court's disposition dates could be linked via a State Transaction Number (STN), but only since July 2002 when the STN was implemented.	An official from Prosecution provided an extract from their database since it has both arrest and disposition dates.
C	How to calculate $P_1(C)$ and $P_2(C)$	State C's State Police was unable to provide the CCH data extract as SDC defined it because of inherent database problems. The repository does not regularly obtain dispositions from the courts; rather, it obtains disposition data from the Corrections Department from which it creates new “dummy” arrests. With the aid of several C++ programs, they can build a RAP sheet, but the underlying data file is unusable, i.e., they cannot use these programs to filter data sets for SDC. This problem prevents State C's Repository from generating statistical reports, a situation they have been attempting to rectify for a long time.	After talking to State Police and learning the extent to which many disposition dates (i.e., the ones that come from Corrections) are unreliable, SDC decided to work with a sample of data (from 1/1/91-12/31/01) to compute $P_1(C)$ and agreed to have them send: 1) Every record in which both the arrest date and final disposition date both are reliable (i.e., the dispos originate from the court). They intentionally filter out records where one or both dates is known to be bad. [This is for computing the elapsed time - numerator of process measure $P_1$ ]; 2) A straight count, by year, of the total number of arrests (or total final dispositions). They sent SDC the total number of arrests which is used for normalizing $P_1(C)$ . SDC is working on $P_2(C)$ ; simulation may be the only approach.

To aid in the modeling, validation, and testing of the RQI, SDC also developed a computer simulation model. Specifically, this model can be used to test for consistency in elapsed time statistics by comparing simulation-generated times to empirically observed times. Thus, it can be used to estimate  $P_1(s)$  and  $P_2(s)$  when sufficient underlying data are unavailable and to estimate posting dates when they are unavailable. The simulation model also serves to

identify records system congestion points and linkages to appropriate improvement activities, a key RQI goal.

### **What are some preliminary RQI findings?**

The 1993, 1997 and 2001 results for the first RQI data collection cycle are presented (Exhibit 11). The importance of comparing the results from year to year *within* a state, rather than *across* states, cannot be overemphasized. This is because not all states collect and report data in an identical manner and, most importantly, the purpose of the RQI is to observe the progress of records improvement within each state.

**Exhibit 11 RQI Results For 1993, 1997 and 2001**

State, s (N=53)	1993				1997				2001			
	O(s)	P <sub>1</sub> (s)	P <sub>2</sub> (s)	RQI(s)	O(s)	P <sub>1</sub> (s)	P <sub>2</sub> (s)	RQI(s)	O(s)	P <sub>1</sub> (s)	P <sub>2</sub> (s)	RQI(s)
Alabama	0.000	223	0.737	0	0.162	197	0.658	54	0.252	423	0.133	8
Alaska	0.061	173	0.813	29	0.235	141	0.874	145	0.481	127	0.896	339
Arizona	0.125	239	0.645	34	0.264	138	0.586	112	0.455	116	0.535	211
Arkansas	0.107	385	0.232	6	0.238	139	0.501	85	0.327	143	0.395	90
California	0.270	314	0.494	43	0.271	271	0.499	50	0.658	251	0.340	89
Colorado	0.226	521	0.044	2	0.236	328	0.030	2	0.645	192	0.061	21
Connecticut	0.060	149	0.922	37	0.221	148	0.925	138	0.504	163	0.958	296
Delaware	0.461	195	0.781	185	0.554	163	0.860	293	0.749	124	0.885	533
District of Columbia <sup>1</sup>	--	--	--	--	--	--	--	--	--	--	--	--
Florida	0.378	287	0.583	77	0.420	202	0.563	117	0.771	199	0.438	170
Georgia	0.156	241	0.694	45	0.344	208	0.791	131	0.665	202	0.710	234
Guam	0.128	282	0.522	24	0.275	151	0.819	149	0.340	134	0.893	227
Hawaii	0.179	157	0.868	99	0.218	150	0.863	126	0.305	140	0.880	192
Idaho	0.212	215	0.639	63	0.314	103	0.902	274	0.377	112	0.943	316
Illinois	0.183	328	0.419	23	0.246	312	0.428	34	0.543	237	0.481	110
Indiana	0.000	498	0.000	0	0.028	377	0.020	0.15	0.317	200	0.159	25
Iowa <sup>1</sup>	0.155	--	--	--	0.188	--	--	--	0.375	--	--	--
Kansas	0.000	227	0.679	0	0.034	223	0.501	8	0.173	291	0.229	14
Kentucky <sup>1</sup>	--	--	--	--	--	--	--	--	--	--	--	--
Louisiana <sup>2</sup>	0.044	--	--	--	0.135	--	--	--	0.298	--	--	--
Maine <sup>1</sup>	0.003	--	--	--	0.043	--	--	--	0.439	--	--	--
Maryland	0.150	134	0.918	103	0.282	135	0.904	188	0.478	163	0.880	258
Massachusetts <sup>1</sup>	0.160	--	--	--	0.195	--	--	--	0.293	--	--	--
Michigan	0.132	168	0.891	70	0.230	138	0.902	151	0.555	106	0.918	483
Minnesota	0.161	244	0.695	46	0.195	198	0.621	61	0.355	134	0.546	145
Mississippi <sup>3</sup>	0.000	--	--	0	0.000	--	--	0.00	0.414	--	--	--
Missouri	0.183	260	0.664	47	0.186	194	0.558	54	0.283	188	0.598	90
Montana <sup>2</sup>	0.146	--	--	--	0.221	--	--	--	0.518	--	--	--
Nebraska	0.000	282	0.626	0	0.144	224	0.467	30	0.478	138	0.536	185
Nevada	0.125	355	0.417	15	0.132	225	0.520	31	0.291	338	0.213	18
New Hampshire	0.000	176	0.819	0	0.000	123	0.870	0.00	0.241	117	0.852	176
New Jersey	0.194	245	0.808	64	0.430	240	0.763	136	0.732	218	0.711	238
New Mexico <sup>4</sup>	0.130	--	--	--	0.223	--	--	--	0.350	--	--	--
New York	0.328	163	0.904	183	0.366	139	0.910	240	0.386	132	0.942	276
North Carolina	0.375	151	0.943	234	0.459	127	0.934	338	0.829	110	0.897	675
North Dakota	0.000	117	0.901	0	0.031	85	0.912	34	0.378	82	0.902	418
Ohio	0.229	410	0.293	16	0.225	337	0.309	21	0.357	241	0.304	45
Oklahoma	0.000	416	0.301	0	0.056	212	0.536	14	0.224	160	0.395	55
Oregon <sup>4</sup>	0.402	101	--	--	0.466	104	--	--	0.683	112	--	--
Pennsylvania	0.213	264	0.730	59	0.311	243	0.572	73	0.607	236	0.482	124
Puerto Rico	0.278	167	0.892	148	0.289	137	0.886	186	0.325	399	0.841	68
Rhode Island	0.111	277	0.578	23	0.111	460	0.725	17	0.181	414	0.540	24
South Carolina	0.256	310	0.546	45	0.384	266	0.545	79	0.455	257	0.547	97
South Dakota	0.098	296	0.363	12	0.273	166	0.705	116	0.440	173	0.685	174
Tennessee	0.037	167	0.851	19	0.172	202	0.894	76	0.378	47	0.706	567
Texas	0.147	506	0.000	0	0.224	201	0.611	68	0.622	174	0.675	242
Utah	0.160	228	0.669	47	0.329	172	0.705	135	0.394	145	0.668	181
Vermont	0.000	--	--	0	0.071	34	0.947	196	0.175	22	0.984	785
Virginia	0.244	152	0.889	143	0.337	124	0.868	236	0.639	116	0.833	458
Washington	0.207	199	0.801	84	0.228	160	0.805	114	0.287	192	0.762	114
West Virginia <sup>1</sup>	0.000	--	--	0	0.037	--	--	--	0.132	--	--	--
Wisconsin	0.111	152	0.833	61	0.201	115	0.800	139	0.479	140	0.720	247
Wyoming	0.231	193	0.646	77	0.250	138	0.852	154	0.376	225	0.680	114
Weighted Average <sup>5</sup>	0.194	288	0.557	56	0.272	213	0.640	102	0.533	193	0.593	202
N	51	42	41	44	51	43	42	43	51	43	42	42

**Notes:**

1. The RQI could not be computed because SDC has not yet received all data.
2. In Louisiana's and Montana's CCH data, the disposition dates were part of a free-text field. SDC is developing an algorithm to extract the dates, so that the respective P<sub>1</sub>, P<sub>2</sub> and RQI can be computed.
3. RQI(MS) cannot be computed -- there was no central repository prior to 1998 and hence virtually no CCH data prior to that date which could be used to calculate P<sub>1</sub>(MS) and P<sub>2</sub>(MS). RQI(MS) cannot be calculated for 2001 since the disposition data is spotty -- the state has been focusing on entering arrest data and has a sizable disposition backlog. In future RQI cycles, there should be enough data on which to base the measures since MS is undertaking a project to reduce the disposition backlog.
4. RQI(NM) and RQI(OR) cannot be calculated because P<sub>2</sub>(NM) and P<sub>2</sub>(OR) are problematic. In New Mexico, SDC obtained relevant data from Prosecution -- which in turn acquired the data only from counties which were automated. Thus, the data is limited. In Oregon, many disposition dates are missing. SDC is working with Oregon to resolve the issue which may require simulation. There is no problem computing P<sub>1</sub>(NM) and P<sub>1</sub>(OR) since SDC employed a representative sample.
5. Average is weighted by the proportion of criminal history records in each state; the weighted RQI(s) is the NRQI.

As one might expect,  $O(s)$  increases over time. In ten states,  $O(s) = 0$  in 1993. This is due largely to the fact that most of the 1993 outcome measures in these states are zero; in some cases, a few are simply unavailable. By 1997,  $O(s) = 0$  in only two states.

The computed state RQI cannot be less than zero and has no upper limit. For 1993, the RQI ranged from 0 to 234 (with a *median* of 35.4); for 1997, the RQI ranged from 0 to 338 (with a *median* of 112.2); and for 2001, the RQI ranged from 8 to 785 (with a *median* of 178.6). One expects the RQIs to increase over time as states make improvements to their criminal history records systems. (By definition, half the states had larger RQIs than the *median* and half the states had smaller RQIs.)

From 1993 to 1997, the median percent RQI increase was 78.5%; from 1997 to 2001, the median percent RQI increase was 77%. Over time, one expects the median percent increase in the RQI to diminish.

Naturally, states with an RQI of zero have considerable room for improvement. It is noteworthy that in 1993 there were eleven such states, whereas in 1997 there were only two and in 2001 there was none.

With few exceptions – due primarily to large arrest fingerprint card and/or disposition backlogs at the repository – the state RQIs increased over time. To better understand the exceptions, SDC plotted the distributions of the arrest data and the disposition data in these states and observed that:

- In Alabama, the arrest volume increased while dispositions dipped sharply for 1999 arrests, then rebounded for 2000 arrests – the state conjectured that this was due to the fact that a large number of dispositions for 1999 arrests had not been entered in the CCH. After entering the dispositions, the state re-extracted the data and SDC determined that this was in fact the case.
- In Nevada, the arrest volume increased while the disposition volume decreased; this is because the repository has a large, growing disposition backlog with insufficient manpower to enter the dispositions in the CCH.
- In Puerto Rico, the arrest volume was steadily increasing until 1999 when it dropped substantially and continued to fall through 2001. The drop is attributable to an arrest backlog at the repository. This caused a dramatic rise in  $P_1$  which in turn resulted in RQI(PR) falling off.
- In Rhode Island, the arrest volume declined between 1991 and 1998 and then rose sharply. The decline was a result of an arrest backlog at the repository.
- In Wyoming, the repository confirmed that an atypical decrease in arrest volumes in 2000-2001 was due to an arrest fingerprint backlog.

In the course of analyzing the measures data, it is imperative to remain in contact with state repository officials and information analysts since their familiarity with the data helps to explain anomalies. In addition to the examples cited above, several interesting results emerged from Vermont's data. For example, the state's  $P_2(VT)$  – which is a reflection of the level of disposition reporting and linkage – was nearly perfect (i.e., 98.4%) in 2001. This can

be attributed to the fact that Vermont has a criminal history records systems that is arraignment-based, i.e., criminal records originate in the courts, rather than with law enforcement at the time of arrest. This arrangement is very effective for arrest-to-disposition linkage purposes. According to Vermont officials, the state enjoyed high linkage levels even when it was one of the least-automated states, suggesting that while automation greatly improves timeliness, it is not essential to improving completeness, i.e., disposition reporting and linking. (It turns out, however, that arraignment-based records are problematic with respect to fingerprint-support. Vermont’s records, which largely fall into this category and are thus ineligible for entry in the Interstate Identification Index (III), are slated for the National Instant Background Check System (NICS) Index of Denied Persons File.) Vermont also has a very low  $P_1(VT)$  – 34 days in 1997 and 22 days in 2001. This is reportedly due to the fact that many people plead guilty at arraignment, thus avoiding an oft-delayed court trial and keeping the time between arrest and final disposition short. An extremely low  $P_1(VT)$  coupled with a very high  $P_2(VT)$  explains Vermont’s high RQI (i.e., 785) in 2001, and is consistent with the RQI’s sensitivity to its constituent measures, as demonstrated in Exhibit 3.

The last row of Exhibit 11 shows the weighted averages of the  $O(s)$ ,  $P_1(s)$ ,  $P_2(s)$  and  $RQI(s)$ , respectively. Each state measure is weighted by the state’s proportion of all criminal history records to obtain its “weighted average” and is discussed below.

### Outcome measures

Regarding  $O(s)$ , its weighted average nearly tripled between 1993 and 2001. The distribution of state responses to three outcome measures,  $O_4$ ,  $O_7$  and  $O_9$ , is shown in Exhibit 12. Respondents selected from a drop-down menu of five possible choices regarding records in their state: “All,” “Most,” “About Half,” “Some,” “None,” and “Don’t Know”.

**Exhibit 12 Distribution of State Responses to Outcome Measures  $O_4$ ,  $O_7$ ,  $O_9$**

Questions	1993 (N = 51)						1997 (N = 51)						2001 (N = 51)					
	All	Most	About Half	Some	None	Don't Know	All	Most	About Half	Some	None	Don't Know	All	Most	About Half	Some	None	Don't Know
$O_4$ . In the indicated year, did your state's criminal history database flag subjects with convictions for:																		
a. Felony offenses?	38%	2%	2%	4%	42%	12%	52%	8%	2%	6%	27%	6%	62%	10%	0%	8%	15%	6%
b. Domestic violence misdemeanors?	4%	0%	0%	2%	85%	10%	17%	4%	2%	4%	65%	8%	31%	8%	0%	2%	56%	4%
c. Sex offenses?	6%	0%	0%	4%	83%	8%	21%	6%	0%	15%	50%	8%	31%	13%	0%	10%	42%	4%
d. Child abuse offenses?	4%	0%	0%	2%	87%	8%	6%	2%	0%	2%	83%	8%	6%	4%	0%	4%	81%	6%
e. Elder abuse offenses?	2%	0%	0%	2%	87%	10%	4%	0%	0%	2%	87%	8%	4%	0%	0%	2%	87%	8%
f. Disabled abuse offenses?	2%	0%	0%	2%	88%	8%	2%	0%	0%	2%	88%	8%	0%	0%	0%	2%	90%	8%
$O_7$ . In the indicated year, did your state electronically submit data to:																		
a. National Protection Order File?	--	--	--	--	--	--	13%	0%	2%	8%	69%	8%	44%	2%	0%	8%	40%	6%
b. National Sex Offender Registry?	--	--	--	--	--	--	--	--	--	--	--	--	50%	6%	0%	13%	25%	6%
c. Mental Defectives/Commitments File?	--	--	--	--	--	--	--	--	--	--	--	--	2%	0%	0%	2%	81%	15%
d. Controlled Substance Abuse File?	--	--	--	--	--	--	--	--	--	--	--	--	0%	0%	0%	2%	79%	19%
e. Denied Person's File (Point-of-Contact states only)?	--	--	--	--	--	--	--	--	--	--	--	--	6%	0%	0%	4%	65%	25%
$O_9$ . In the indicated year, what fraction of the following state files did authorized users have direct automated access to:																		
a. Protection order?	17%	0%	0%	0%	63%	19%	46%	2%	2%	2%	35%	13%	63%	4%	0%	6%	17%	10%
b. Sex offender registry?	12%	0%	0%	2%	71%	15%	42%	4%	2%	10%	27%	15%	67%	6%	0%	8%	10%	10%
c. Mental health information relevant to firearms eligibility?	2%	0%	0%	2%	81%	15%	10%	0%	0%	6%	71%	13%	17%	0%	0%	8%	63%	12%
d. Drug abuse information relevant to firearms eligibility?	6%	2%	0%	0%	69%	23%	8%	2%	0%	4%	63%	23%	10%	2%	0%	6%	60%	23%

Regarding measure  $O_4$  – flagging of subjects with specific types of convictions – felony flagging is the most prevalent across all measured years; this is likely due to the fact that felony flagging has been a federal priority since the late 1980s whereas the other federal flag setting requirements were imposed more recently. Subjects with domestic violence misdemeanors and sex offenses are being flagged more conscientiously but much work remains to be done; almost one-third of the responding states are now flagging all subjects with these two categories of records. Flagging of child, elder and disabled abuse, lag far behind. In the event that new federal priorities mandate flagging subjects with yet other types of offenses, SDC will incorporate them in the RQI.

Measure  $O_7$  is not relevant in 1993 and is only relevant in 1997 for the National Protection Order File (NPOF), since the other files did not exist prior to that date. Between 1997 and 2001, the fraction of states submitting all their data electronically to the NPOF more than tripled (from 13% to 44%). In 2001, 69% of all states were submitting at least some data electronically to the National Sex Offender Registry (NSOR) – 50% were transmitting all data automatically. Populating the NPOF, the Mental Defectives, the Controlled Substance Abuses, and the Denied Persons Files (DPF) is especially important because these files are checked to determine whether a person is ineligible to purchase a firearm; the last three files are not so well populated as the NPOF and the NSOR. The DPF is especially helpful: Not only does this file contain names of individuals who have been previously denied a firearm, but it also contains disqualifying records that are not in other federal files used to determine firearm eligibility, such as the Interstate Identification Index (III) of criminal records, the National Crime Information Center (NCIC) files of warrants and “hot” files, and the NICS Index of non-criminal records. The DPF includes persons denied for misdemeanor crimes of domestic violence, warrants that do not meet criteria for entry in NCIC, active protection orders not available in NCIC, and criminal history records not supported by fingerprints.

Direct automated access to state protection order and sex offender registry files has increased dramatically since 1993 (measure  $O_9$ ), so that in 2001 approximately two-thirds of the states responded that all records in both files could be accessed automatically. Automated access to mental health and drug abuse information lag behind substantially (17% and 10%, respectively).

### *Process measures*

To gauge how the nation is performing in regard to timeliness and completeness of records, one can compute the weighted averages of  $P_1(s)$  and  $P_2(s)$ , respectively, for all states and chart their progress over time.

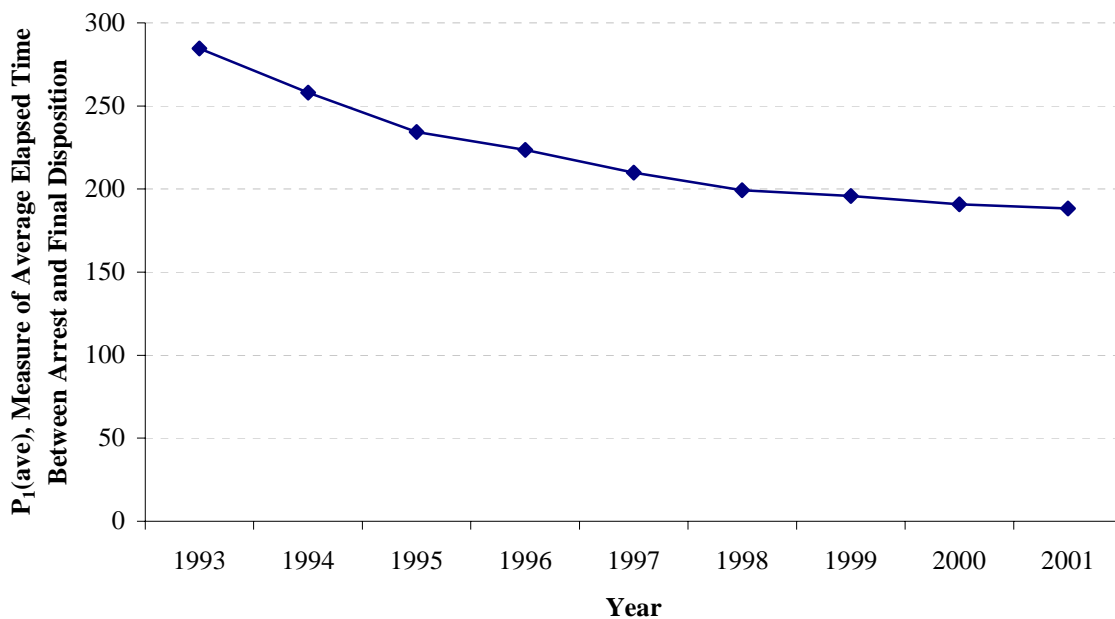
Exhibit 13 depicts  $P_1(\text{ave})$ , the national weighted average of the individual  $P_1(s)$ . In other words:

$$P_1(\text{ave}) = w(1)*P_1(1) + w(2)*P_1(2) + \dots + w(53)*P_1(53)$$

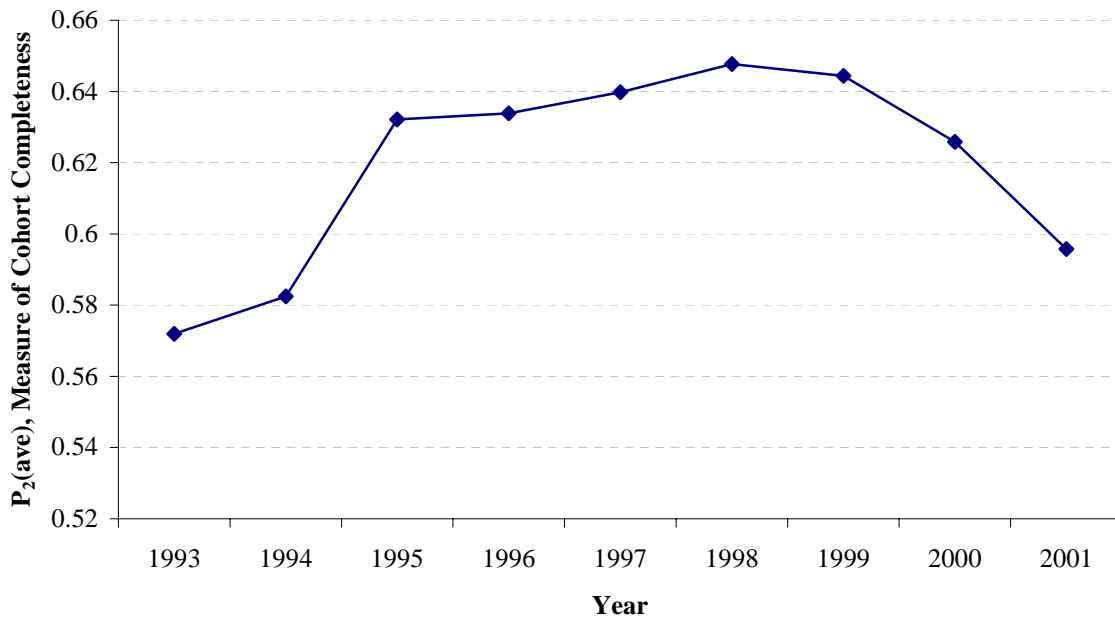
where  $w(s)$  = weight of state  $s$  = ratio of number of criminal history records in state  $s$  to number of records nationwide; currently,  $s = 53$ .

As one might expect,  $P_1(\text{ave})$  decreases over time; in fact, it decreased substantially – by 34% between 1993 and 2001, the first and last measured time periods – from 285 to 188 days. Overall, the behavior of  $P_1(\text{ave})$  mirrors the behavior of the individual  $P_1(s)$  and clearly suggests that strides are being made in reducing the average time between an arrest and its final disposition.

*Exhibit 13  $P_1(\text{ave})$ , Weighted Average of  $P_1(s)$*



*Exhibit 14  $P_2(\text{ave})$ , Weighted Average of  $P_2(s)$*



Similarly, Exhibit 14 illustrates  $P_2(\text{ave})$ , the national weighted average of the individual  $P_2(s)$ . So:

$$P_2(\text{ave}) = w(1)*P_2(1) + w(2)*P_2(2) + \dots + w(53)*P_2(53)$$

where  $w(s)$  = weight of state  $s$  = ratio of number of criminal history records in state  $s$  to number of records nationwide; currently,  $s = 53$ .

In this case,  $P_2(\text{ave})$  initially increases and then declines beginning in 1997. To speculate why this might be occurring, it is important to understand that two phenomena impact  $P_2(\text{ave})$ ; first, the number of arrests for which there are final dispositions rendered by the end of a specified time period – for which SDC collected data – and, second, the rate at which dispositions are being reported to and posted in the repository – for which SDC was not able to collect data since disposition receipt and posting dates were not available.

The behavior of  $P_2(\text{ave})$  may be attributable to disposition reporting. The significant jump (i.e., 8%) in  $P_2(\text{ave})$  between 1994 and 1995 could be due to the Criminal History Records Improvement (CHRI) program funds which were administered from FY 1990 through FY 1993 and which emphasized automated disposition reporting. The gains in reporting level off and reach a steady state with the 1995 arrest cohort. The steady decline in  $P_2(\text{ave})$ , starting with the 1997 arrest cohort, may be explained by the fact that it still takes a long time on average for dispositions to get into the repository; we should expect to see improvements in the 1997, 1998 and 1999 arrest cohorts in the future. By continuing to request annual extracts of the CCH data, SDC will gain a better understanding of the disposition reporting time frame.

### *National Records Quality Index*

As noted earlier, the national RQI, NRQI – a measure of the overall performance of the nation’s criminal history records systems – is a weighted average of the individual state RQIs, where the weights are reflective of the number of criminal history records in each state.

Thus, the NRQI is of the form:

$$\text{NRQI} = w(1)*\text{RQI}(1) + w(2)*\text{RQI}(2) + w(3)*\text{RQI}(3) + \dots + w(53)*\text{RQI}(53)$$

where,  $w(s)$  = weight of state  $s$  = ratio of number of criminal history records in state  $s$  to number of records nationwide; currently,  $s = 53$

To illustrate how the NRQI is computed, assume that the “nation” consists only of six states; i.e.,  $s = \{A, B, C, D, E, F\}$ . Further, assume that the states’ RQIs,  $\{\text{RQI}(s)\}$ , the numbers of records (in thousands), and the weighting factors,  $\{w(s)\}$ , are as follows:

RQI(A) = 61.9	# records in state A = 1,100	$w(A) = 1,100/5,633 = 0.195$
RQI(B) = 49.8	# records in state B = 539	$w(B) = 539/5,633 = 0.096$
RQI(C) = 40.4	# records in state C = 1,344	$w(C) = 1,344/5,633 = 0.239$
RQI(D) = 54.5	# records in state D = 815	$w(D) = 815/5,633 = 0.145$
RQI(E) = 100.2	# records in state E = 627	$w(E) = 627/5,633 = 0.111$



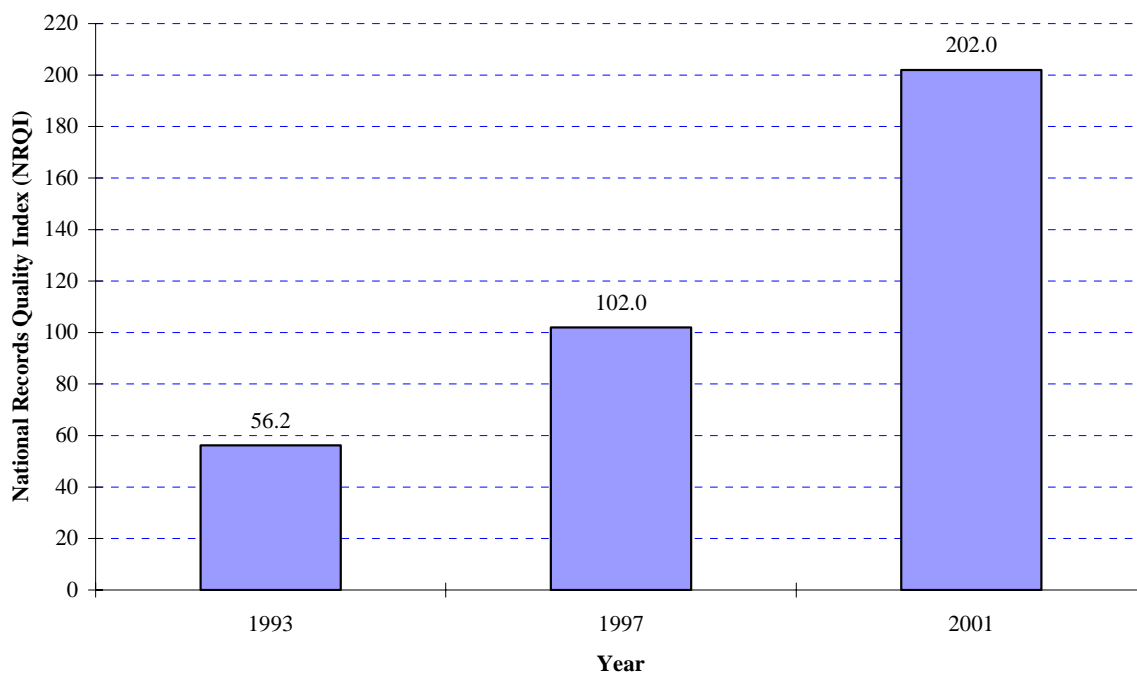
$$\text{RQI}(F) = 92.7 \quad \# \text{ records in state } F = \frac{1,208}{5,633} \quad w(F) = 1,208/5,633 = 0.215$$

Then, a six-state NRQI would be given by:

$$\text{NRQI} = 0.195*61.9 + 0.096*49.8 + 0.239*40.4 + 0.145*54.5 + 0.111*100.2 + 0.215*92.7 = 65.5$$

As shown graphically in Exhibit 15, between 1993 and 1997, the NRQI grew from 56.2 in 1993 to 102.0 in 1997. With continued federal funding and its resulting improvements, we can expect to see the NRQI continue to grow in future years. The more effectively the funding targets areas of potential improvement, the more that improvement will raise the individual state RQI(s) and be reflected in the growth of the NRQI.

**Exhibit 15 National Records Quality Index (NRQI)**

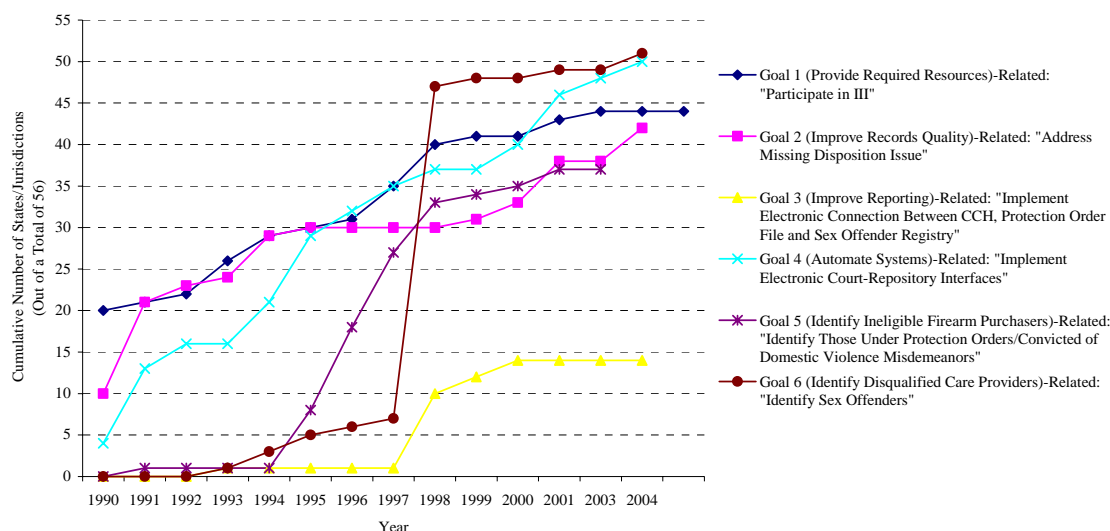


*Relationship to records improvement activities*

During NCHIP’s predecessor effort, the CHRI program, SDC developed a taxonomy to classify and monitor the federally-funded criminal history records improvement activities and to facilitate data analysis. The taxonomy mirrors the functions of the criminal justice system in regard to in the creation, storage and dissemination of criminal history records and has become the cornerstone of SDC’s national program evaluation. Over past funding cycles, it has been enhanced to accommodate new allowable improvement expenses and is now used to classify more than 3,500 activities. Exhibit 16 demonstrates the analytical power of the taxonomy: For each of the six major NCHIP goals, the progress in criminal history records improvement is brought to light by the cumulative number of states which have undertaken key goal-based activities over a period of 15 years (1990-2004). For example, 1997 saw the

rapid growth in states' attempts to identify sex offenders, dovetailing with the introduction of National Sex Offender Registry (NSOR) program funds.

**Exhibit 16 Progress in Criminal History Records Improvement (1990-2004) – Key Goal-Related Activities**



In relation to the RQI, SDC will use the taxonomy to link activities to changes in a state's RQI – to ascertain which activities are most likely to yield the greatest increase in each state's RQI. This will be accomplished by mapping the underlying RQI outcome and process measures to individual activities.

**What's next?**

Over the past 18 months, SDC, in consultation with BJS, developed a robust RQI, pre-tested it in ten pilot states, and refined it accordingly. The first national data collection cycle has been successfully completed and state RQIs as well as the national RQIs for the years 1993, 1997 and 2001 have been computed and reported herein.

In forthcoming cycles, SDC will again obtain measures data and compute the annual state RQIs, as well as the national RQIs. Thus, each participating state and territory will have an associated RQI time series consisting of data points for 1993, 1994, 1995, etc. Based on the lessons learned during the first cycle, SDC will refine the underlying RQI measures, and add new measures as necessary to reflect new records improvement goals and corresponding federally-sponsored activities; of course, SDC will continue to track all state activities closely. To further streamline the data submission process, SDC will improve the Web-based data collection instrument by, for example, incorporating additional data edits. Perhaps the most significant enhancement to the next RQI cycles will be the development of a tool that will assist states to identify those activities eligible for federal funding which will

yield the greatest improvement in the measures that underpin their respective RQIs. This “State-Specific RQI Optimizer” (SSRO) will justify the process of selecting activities for improvement, thereby enabling the states to base their requests for federal funds on strategies that can potentially yield significant improvements in their RQIs; hence, quality improvements to their criminal history records.