

TCR Compliance Analysis

1998 - 2005 Data Trends and Inferences

TCR/DS Stakeholders Workshop February 1, 2007

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Purpose of Presentation

- Present available data on Total Coliform Rule compliance and implementation
- Exhibit data trends
- Discuss potential implications and further data analysis



Data Sources

- Safe Drinking Water Information System – Federal System (SDWIS/Fed)
 - Data sent by States to EPA
 - Inventory and violation data
- Data Verification Information (Data and Reports)
 - Verification of data reported by States to SDWIS
 - Comparisons of violations looking at raw data versus what's reported by States to SDWIS
- ASDWA Distribution System and Total Coliform Rule Survey
 - State DS control practices
- State TCR and DS Requirements
 - Downloaded from State internet sites



MCL Violations

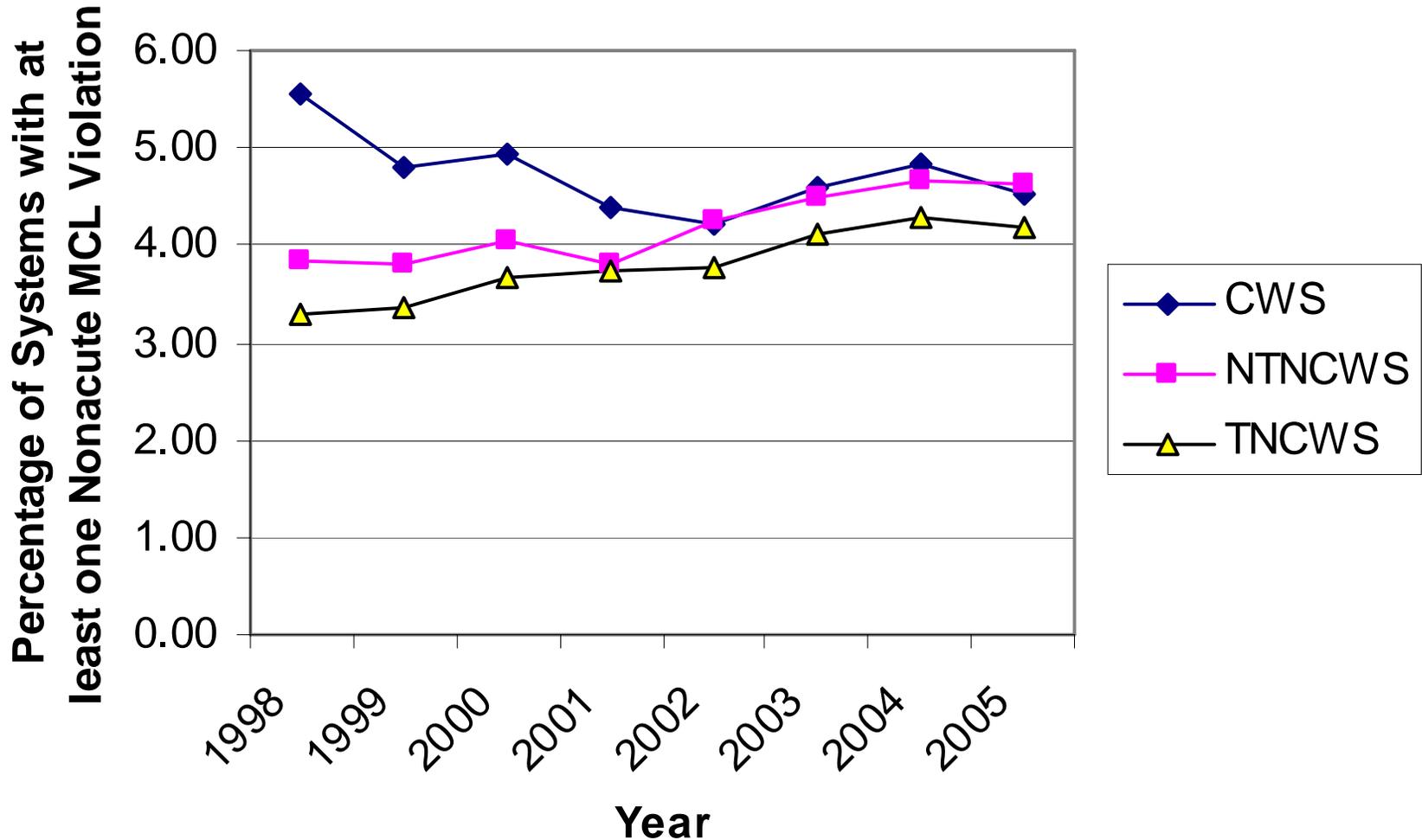


Definitions

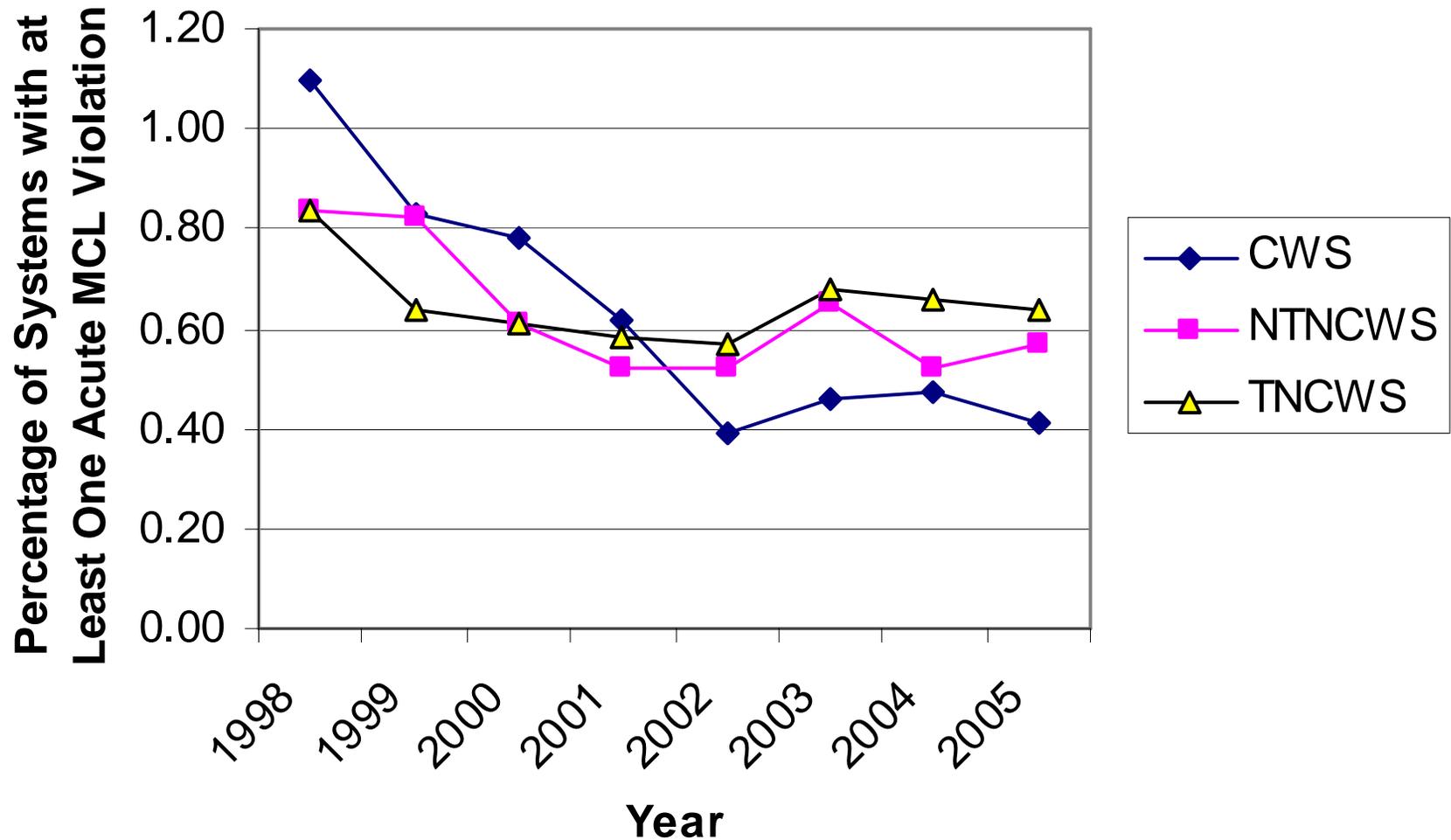
- Nonacute MCL Violation
 - For systems taking fewer than 40 routine samples per month with more than one sample/month TC+
 - OR
 - For systems taking more than 40 routine samples per month with more than 5.0% samples/month TC+
- Acute MCL Violation
 - PWS has any fecal coliform- or E. coli-positive repeat sample
 - OR
 - PWS has a fecal coliform- or E. coli-positive routine sample followed by a total coliform-positive repeat sample.



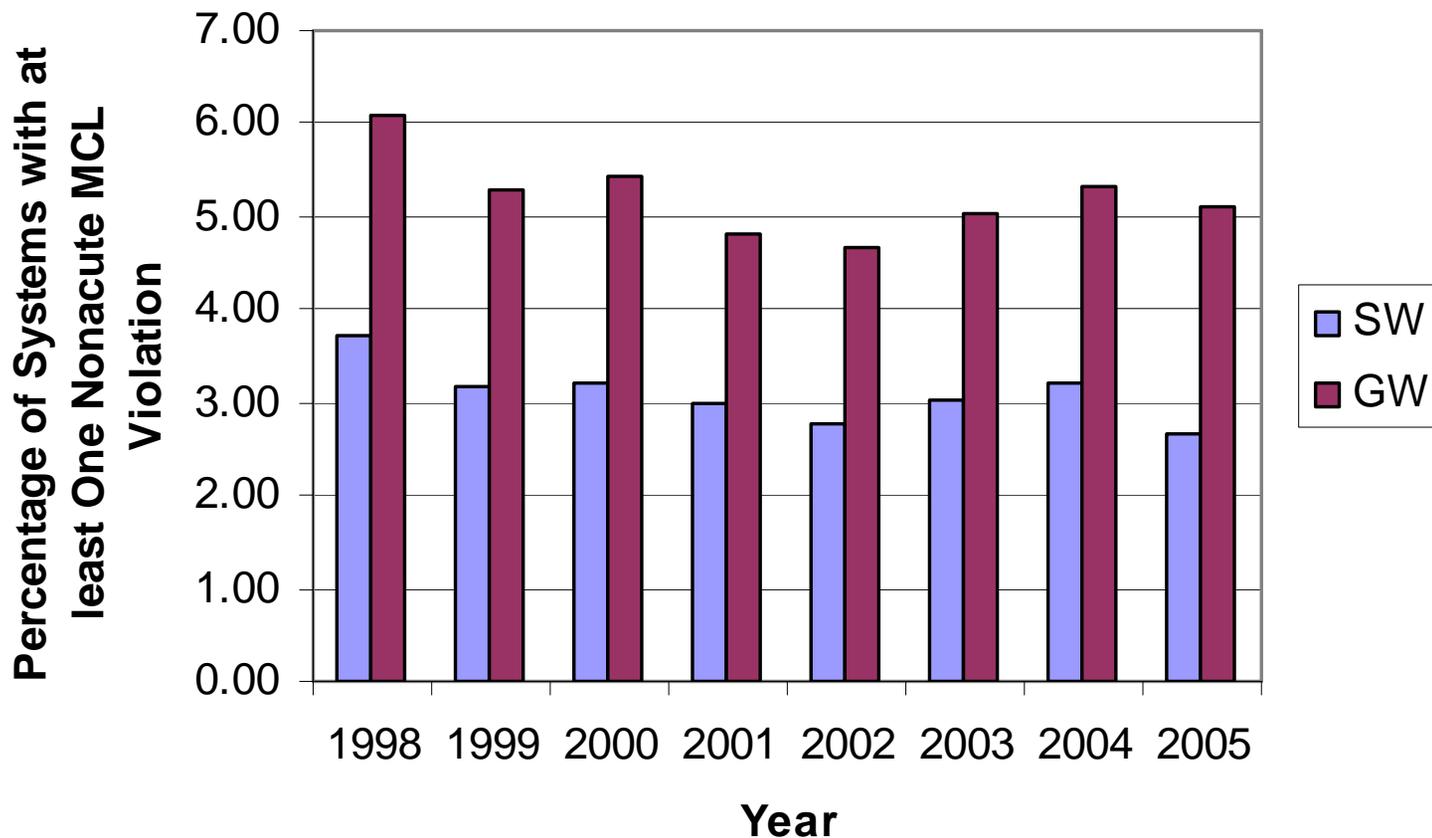
Nonacute MCL Violations



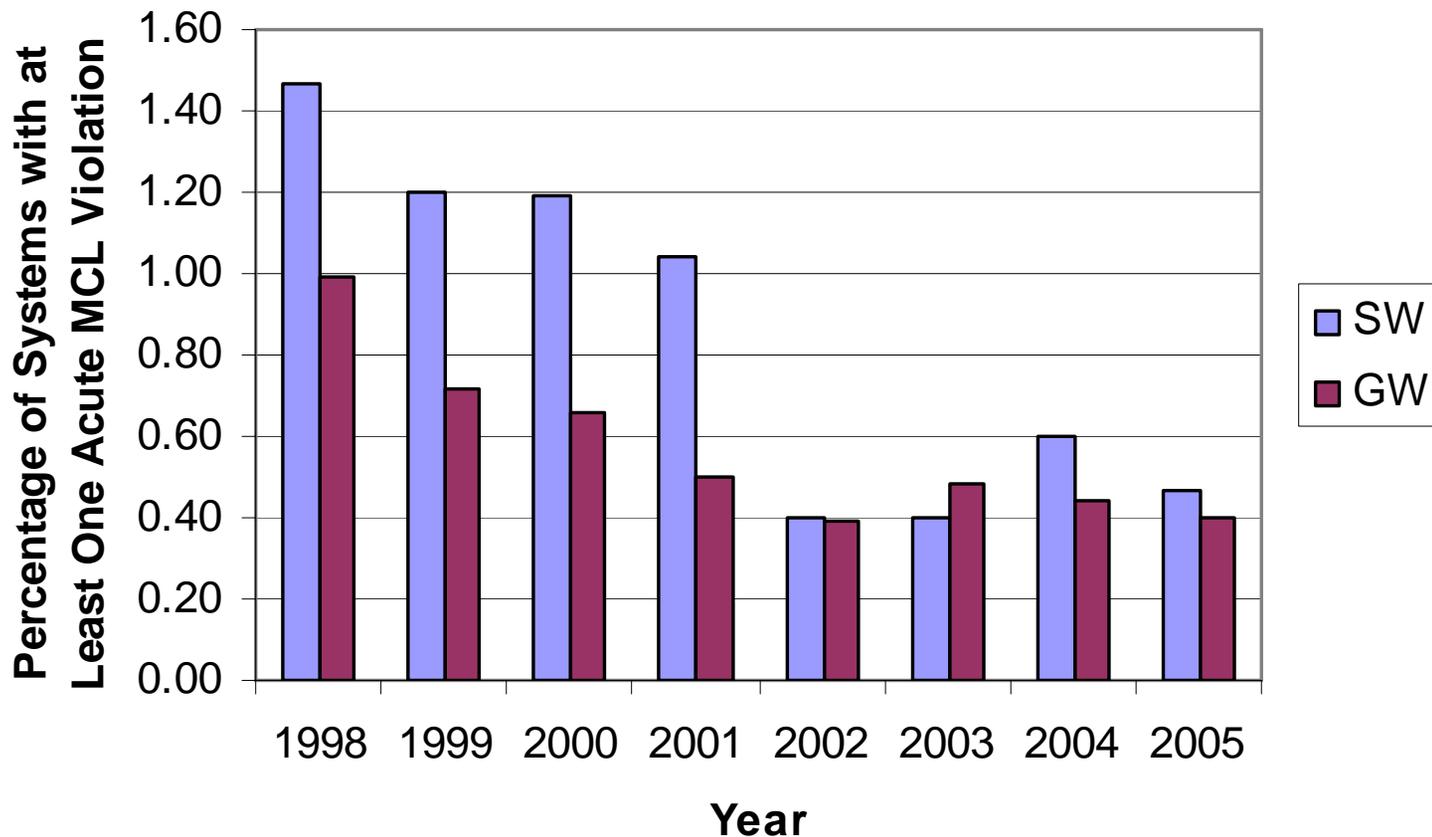
Acute MCL Violations



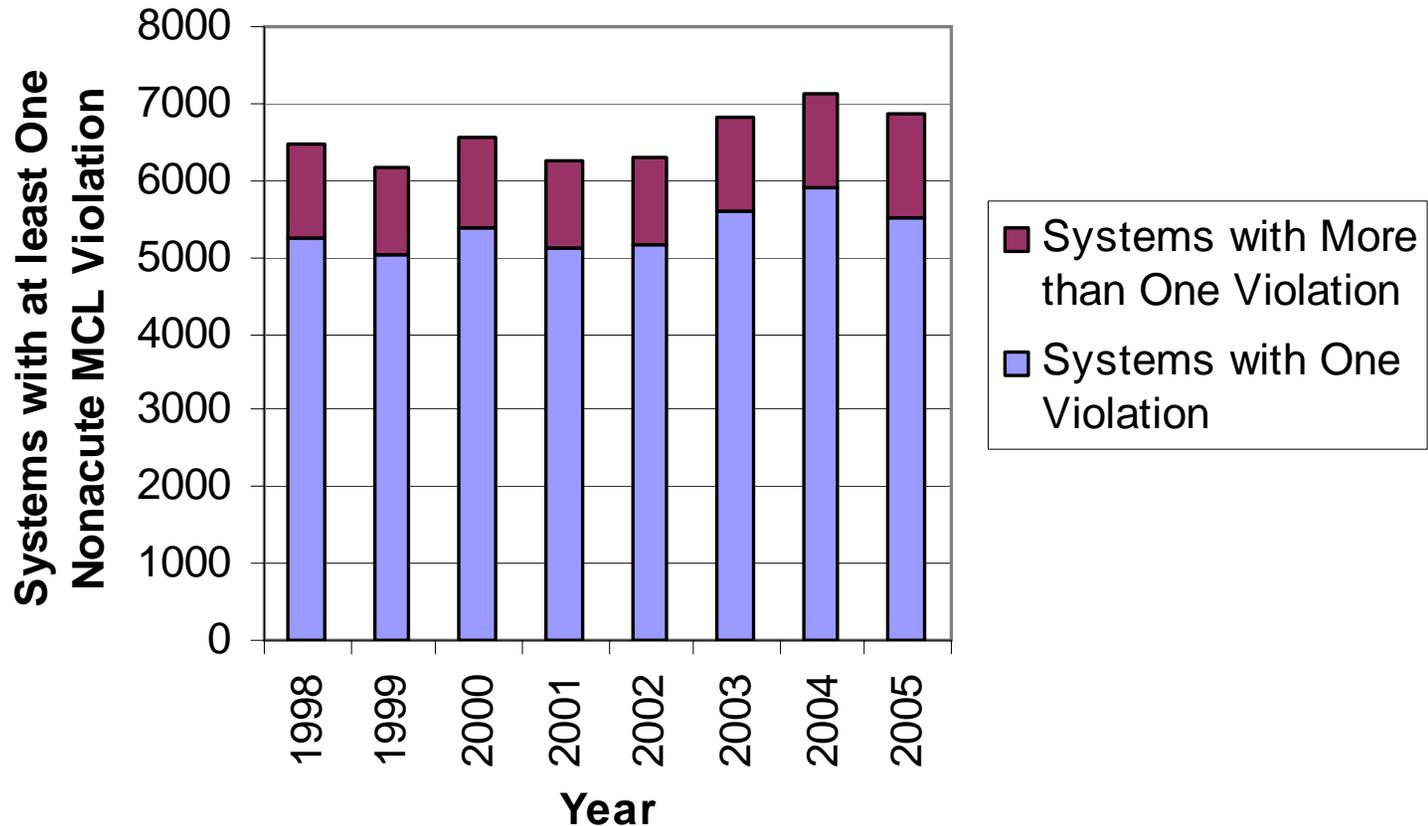
Nonacute MCL Violations by Source Type for CWSs



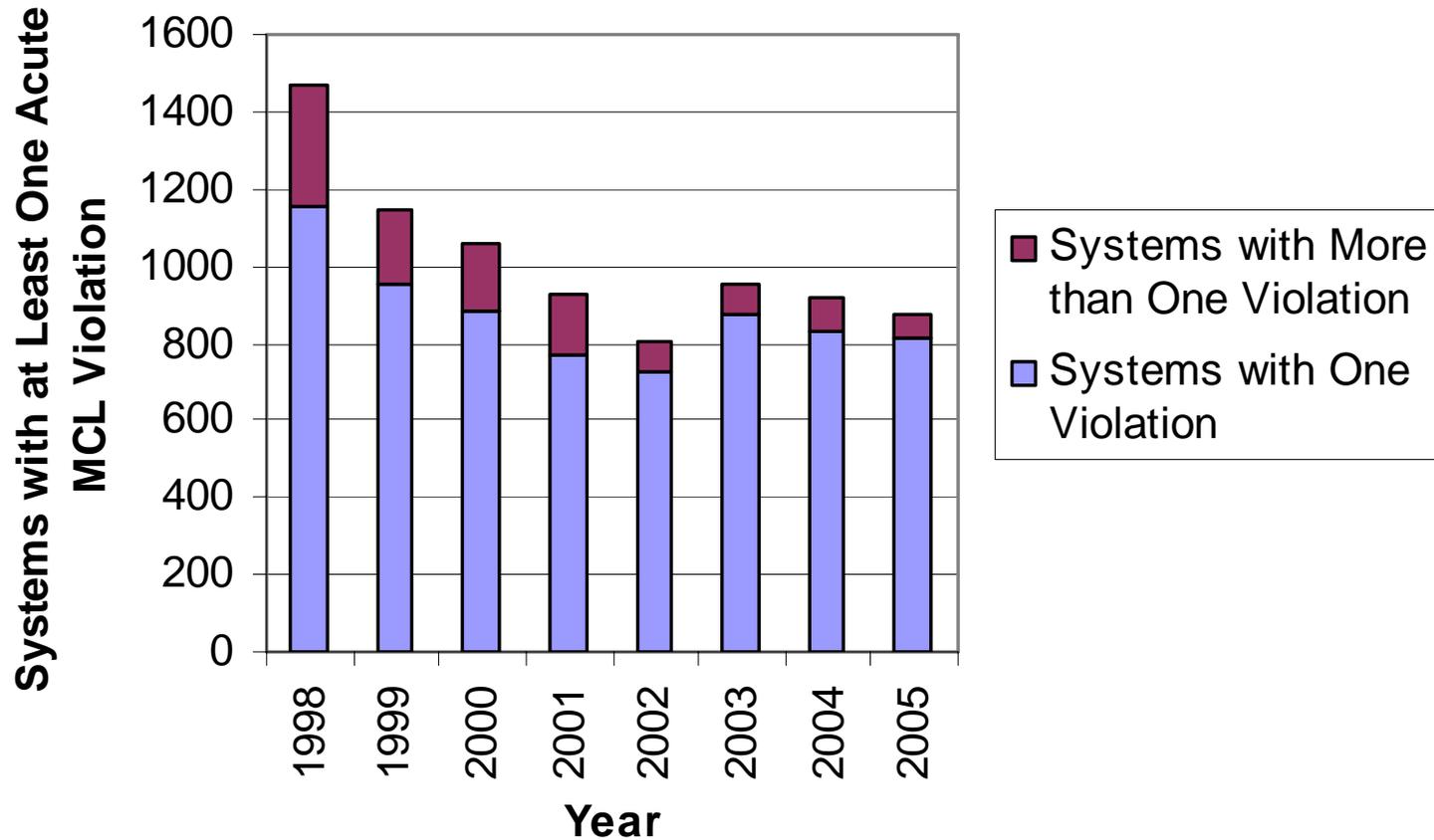
Acute MCL Violations by Source Type for CWSs



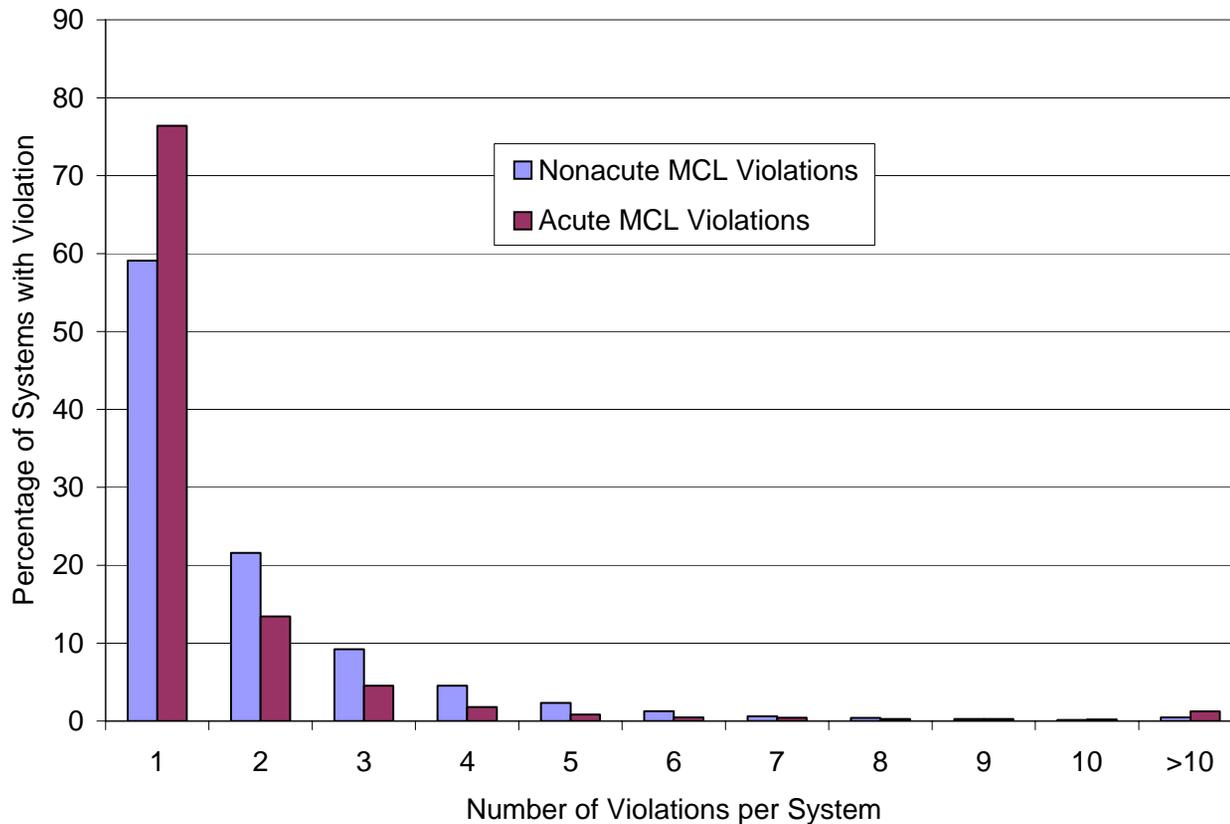
More than One Nonacute MCL Violations within a Year for all PWSs



More than One Acute MCL Violations within a Year for all PWSs



Multiple Violation Rates Among all PWSs for MCL Violations from 1998 to 2005

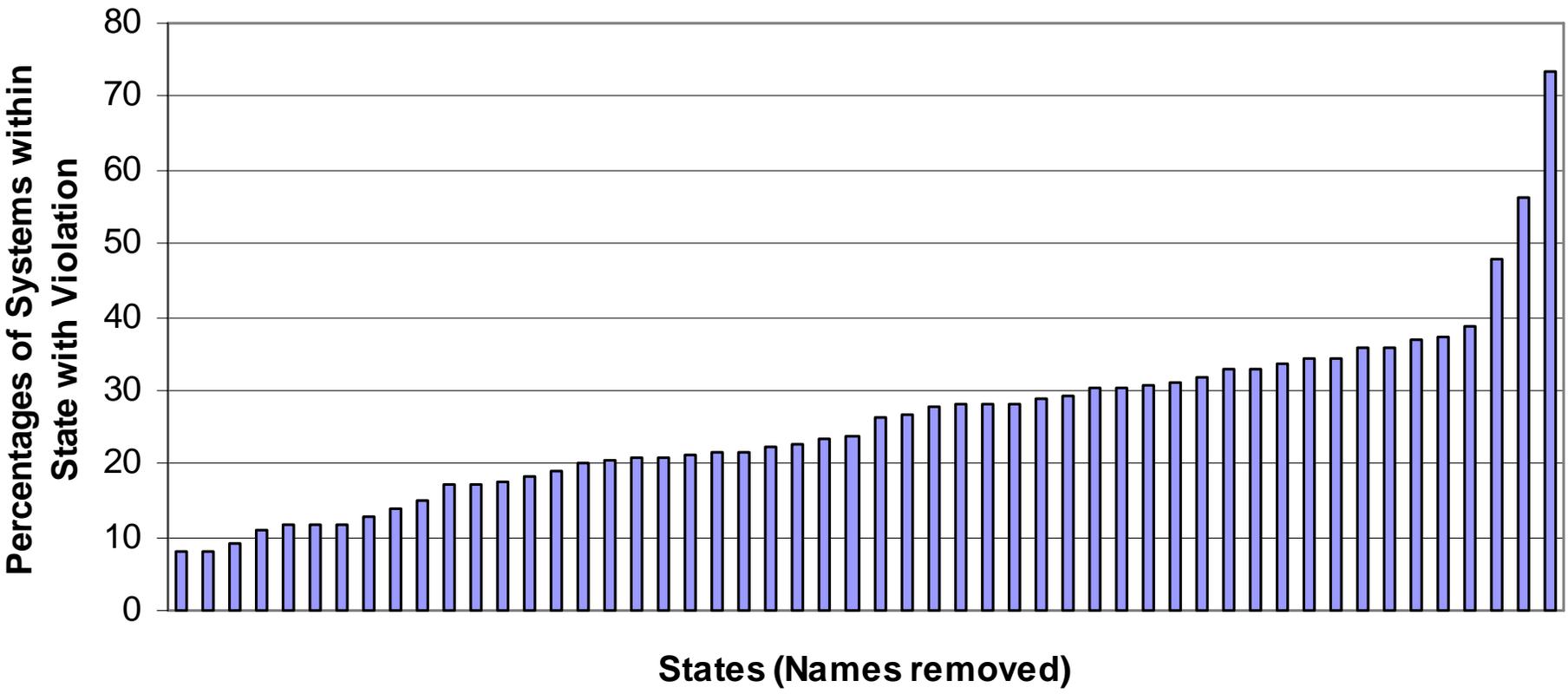


Percentages of Disinfected and Undisinfected GW CWSs with MCL violations in 2005

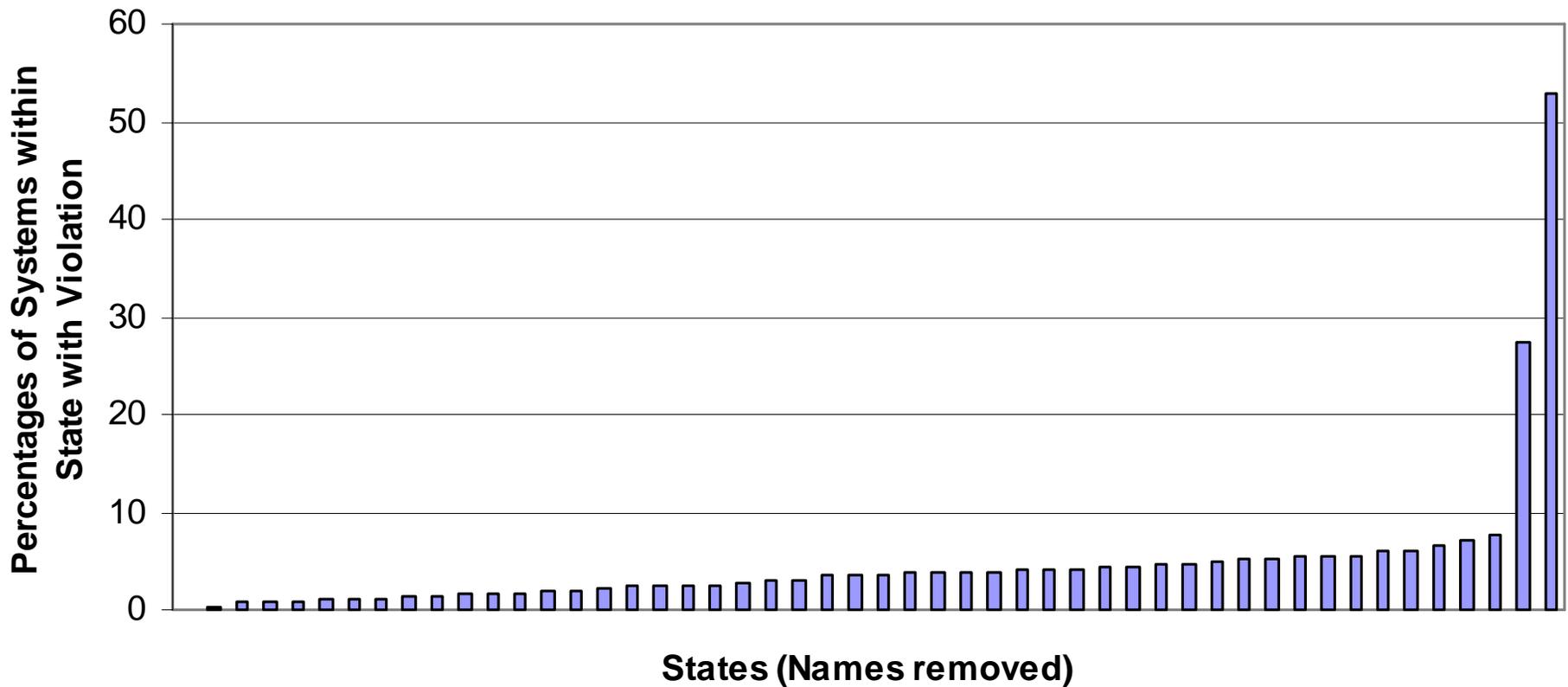
	Nonacute	Acute
Disinfected	3.31%	0.31%
Undisinfected	8.36%	0.56%



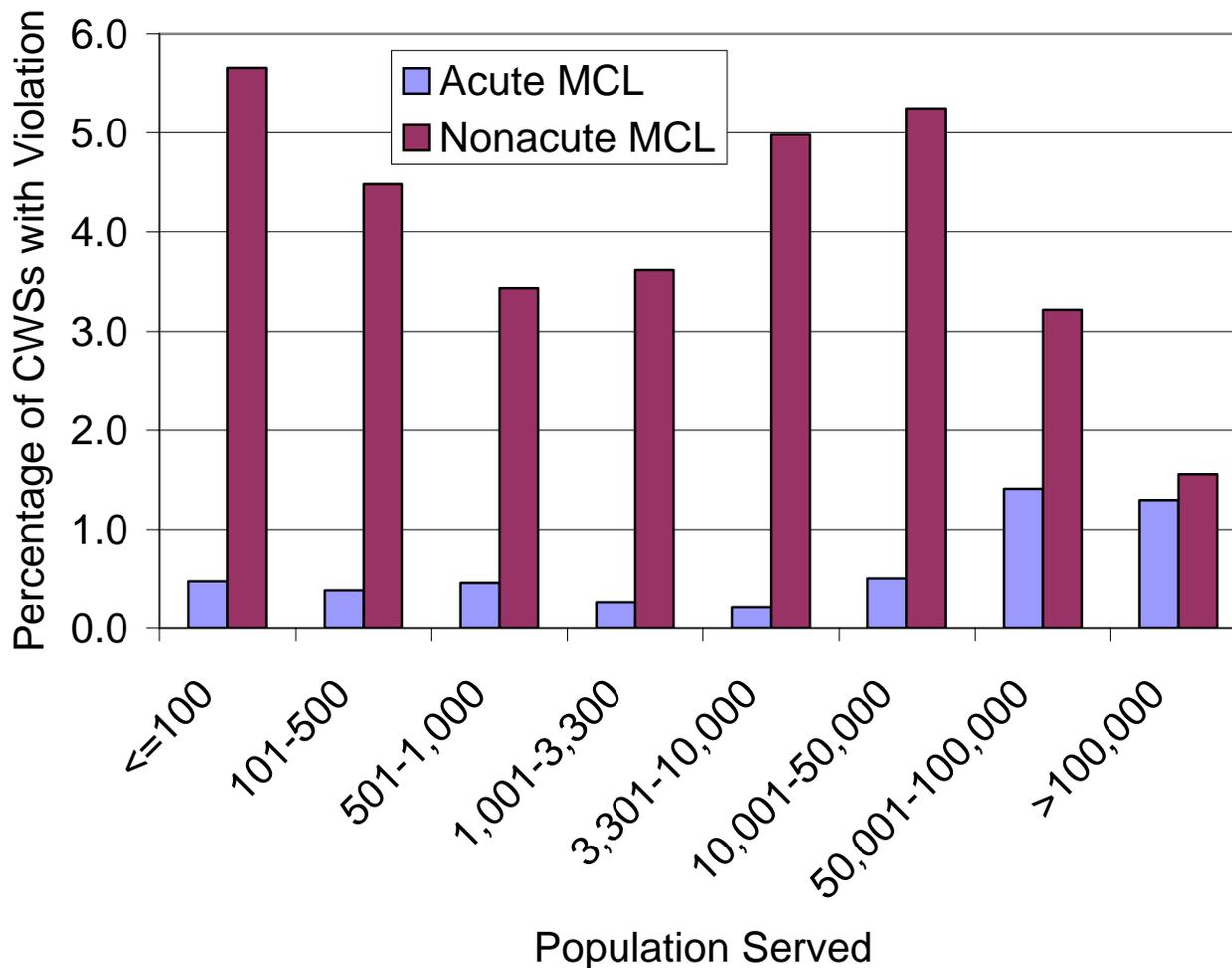
Nonacute MCL Violation Rates by State from 1998 to 2005



Acute MCL Violation Rates by State from 1998 to 2005



2005 MCL Violations in CWSs by System Size



Percentage of CWSs with MCL Violations in 2005 by Source Water Type and Size Category

		<4,900	4,900-100,000	>100,000
Nonacute MCL Violations	GW	5.1	6.7	1.4
	SW	2.2	4.0	1.6
Acute MCL Violations	GW	0.4	0.6	2.9
	SW	0.5	0.3	0.9



Summary of Main Points: MCLs

- Common for Both Acute & Non-acute Violations:
 - Most systems don't have repeat violations in the same year
 - Significantly higher violation rates for undisinfected GWSs than either disinfected GWSs or SWSs (>2 fold)
 - Most violations occur among different systems rather than among systems with repeat violations
 - Within a given year
 - Across years
 - Seven to ten-fold difference among States in percentages of systems with violations



Summary of Main Points: MCLs

- Specific for Non-acute Violation:
 - Violation rates are comparable among different system types (CWSs vs NCWSs) – roughly 4-5%
 - Higher violation rate for very small vs very large systems, especially for GWSs
 - Relatively stable 98 - 05



Summary of Main Points: MCLs

- Specific for Acute Violation:
 - Violation rates among SW systems significantly drop after 2001 & become relatively stable after that
 - CWSs have lower violation rate than NCWSs
 - Higher violations for large systems over small
 - For CWSs, violation rates dropped significantly between 98 and 01 – relatively stable after



Monitoring and Reporting Violations



Definitions

- Major Routine MR Violation
 - Failure to take all of the required routine samples in a compliance period
- Minor Routine MR Violation
 - Failure to take some of the required routine samples in a compliance period

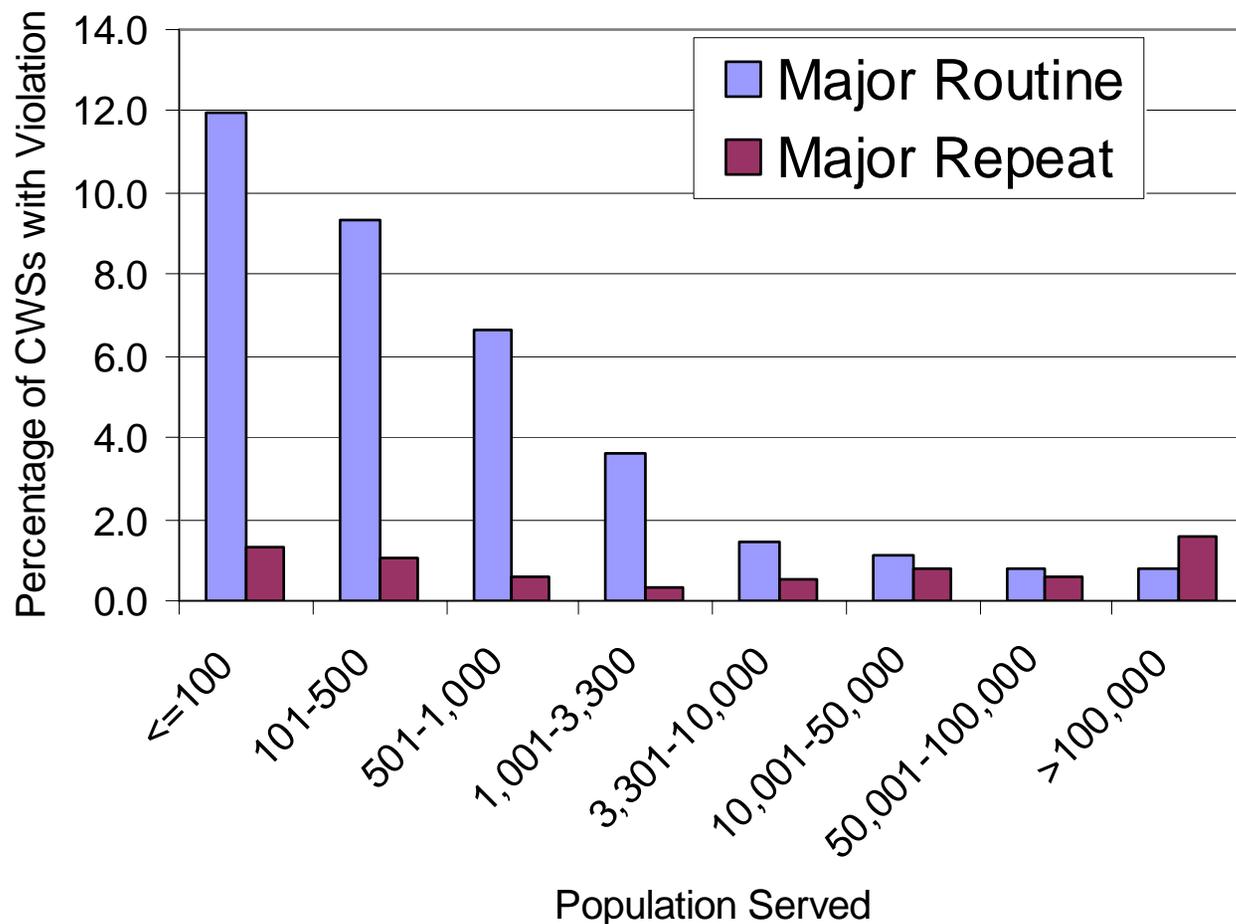


Definitions

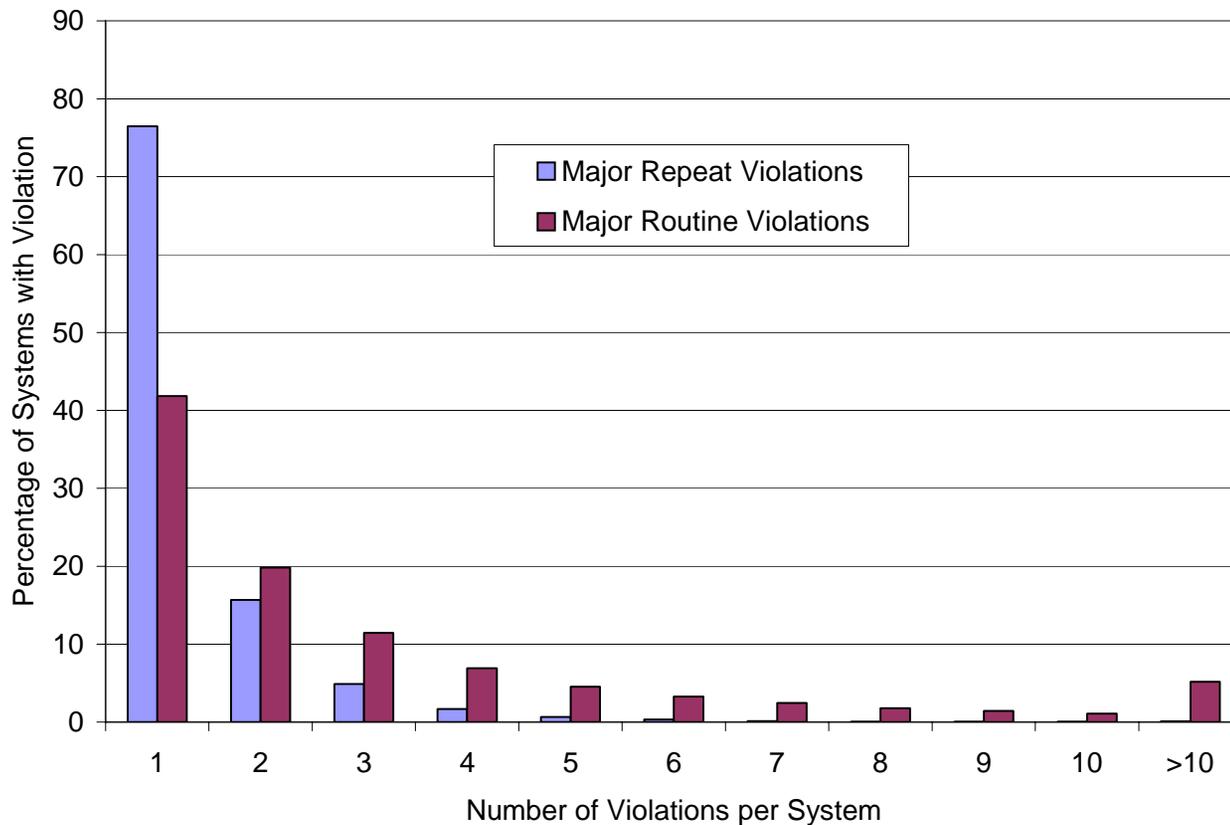
- Major Repeat MR Violations
 - Failure to conduct all of the follow up repeat monitoring after a TC-positive sample
- Minor Repeat MR Violations
 - Failure to conduct some of the follow up repeat monitoring after a TC-positive sample



2005 Monitoring and Reporting Violations in CWSs by System Size



Major Routine and Repeat MR Violations from 1998 to 2005 for CWSs

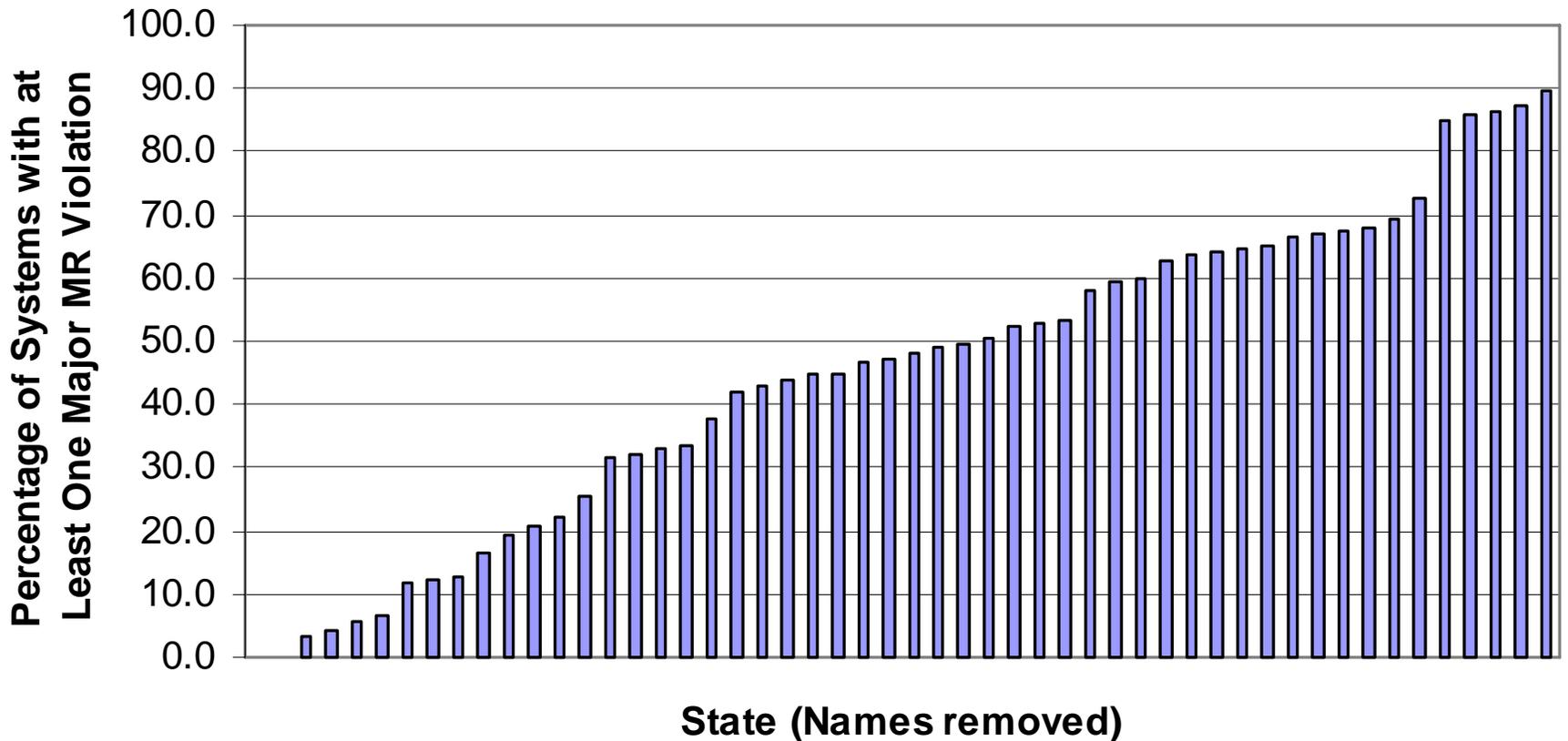


Percentage of CWSs with MR Violations in 2005 by Source Water Type and Size Category

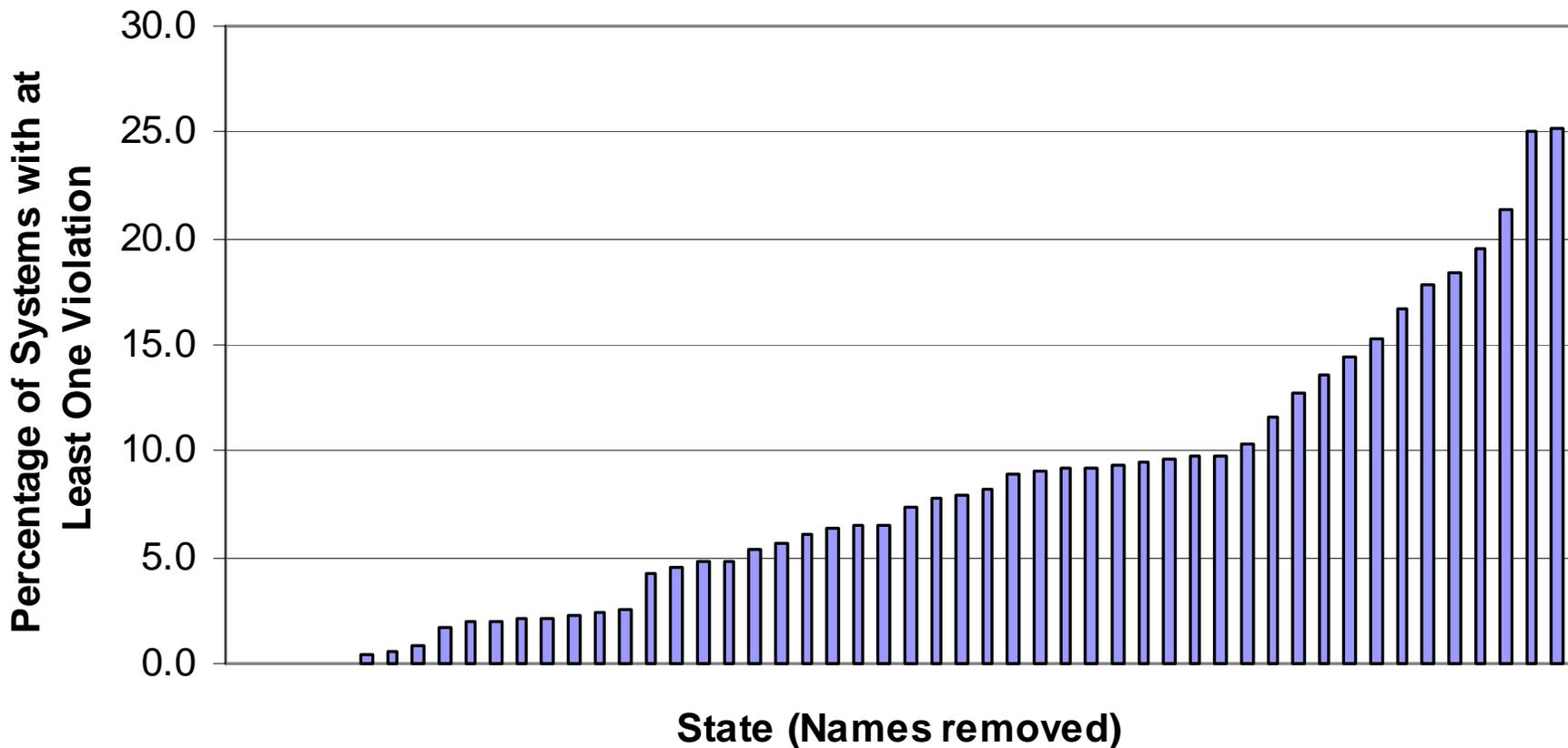
		<4,900	4,900-100,000	>100,000
Major Routine Violations	GW	8.5	1.2	0.0
	SW	8.0	1.1	0.9
Major Repeat Violations	GW	1.0	0.6	4.3
	SW	0.7	0.7	0.9
Minor Routine Violations	GW	2.1	2.2	1.4
	SW	2.7	3.1	1.9
Minor Repeat Violations	GW	0.4	0.6	1.4
	SW	0.4	0.3	1.6



Major Routine MR Violations by State from 1998 to 2005



Major Repeat MR Violations by State from 1998 to 2005



Possible Reasons for Differences in Violation Rates among States

- Source Water Type
- State monitoring/reporting protocols (sites, times, plan, etc)
- State sanitary survey programs and practices
- Control Strategies
 - Disinfection requirements
 - State supervision programs of management practices in DS
 - Such as CCC programs, minimum pressure, flushing
 - Other control requirements



Data Verification



General Findings of DV (Major differences in how States implement TCR)

- Monitoring frequency
- TC+ and EC+ follow-up actions
- Policies and practices in recognizing monitoring violations
- Sanitary Surveys
- Broad range of data quality being reported



Differences in Monitoring Frequency and Timing for Small Systems

- Alternative minimum monitoring frequencies implemented by Different States included
- Min of 2 samples/year
- No reduction to annual sampling
- Monthly sampling required
- Monthly sampling for undisinfected systems
- Weekly for systems serving >600
- Some States allow systems >4900 to collect samples on same day
- Holding times allowed up to 48 hours



Policy and Practices Defining and Identifying Responses to Violations

- EC+ automatic boil-water order
- EC+ or FC+ and system fails to collect repeat sample: automatic acute violation, boil-water order, public notification
- Automatic acute violation and boil-water order for systems that fail to collect repeat samples following a TC+
- Automatic boil-water order following FC or EC+ followed by special investigation within 2 days



Policies and Practices Recognizing Different Monitoring and Reporting Violations

- At least 5 routine samples in month following a TC+
- Collecting repeat samples within or not within 24 hrs. of being notified
 - Large range of up to 7 days in some States
- Differences in procedures allowed for notifying system (email, mail, phone, fax)
- Differences in procedures allowed for notifying State (email, mail, phone fax)



Frequency of Sanitary Surveys – goals and compliance with requirement

- Reviews focus on whether system had sanitary survey every 5 years
- Sanitary surveys mostly conducted by State/local government
- Frequency goals vary from twice a year for CWSs to every year to every 10 years for NCWSs
- Some states far exceed minimum requirements
- Many States did not meet minimum 5 year frequency requirements in all systems reviewed



Overall Conclusions

- Substantial percentage of systems incur nonacute MCL violations each year (3-8% of systems) and the trend is relatively constant
- 10% of those with nonacute MCL violations also incur acute MCL violations
 - Need to understand how this rate is affected by TC monitoring requirements
- Highest MCL (both acute and nonacute) violation rates occur among undisinfected GWSs
 - Need to evaluate significance and potential implications of GWR



Overall Conclusions (cont.)

- Violation rates differ broadly across States
 - Need to understand more specifically what are the causative factors
- Highest Repeat Major MR violation rates occurred in systems serving <100 people and >100,000 people vs other system sizes
 - Need to understand basis



Appendix



Numbers of Systems Audited during Data Verification by System Type

	1998	1999	2000	2001	2002	2003	2004
CWS	15	216	243	352	458	322	367
NTNCWS	10	152	200	241	321	211	241
TNCWS	5	172	206	251	297	224	217



Numbers of Systems Audited during Data Verification by Source Type

	1998	1999	2000	2001	2002	2003	2004
Unknown				2			
GW	28	454	603	732	909	549	703
SW	2	86	46	110	167	208	122



Data Quality and Completeness by System Type

	Complete	Accurate	Data Quality
CWS	40%	90%	38%
NTNCWS	40%	86%	37%
TNCWS	59%	92%	55%

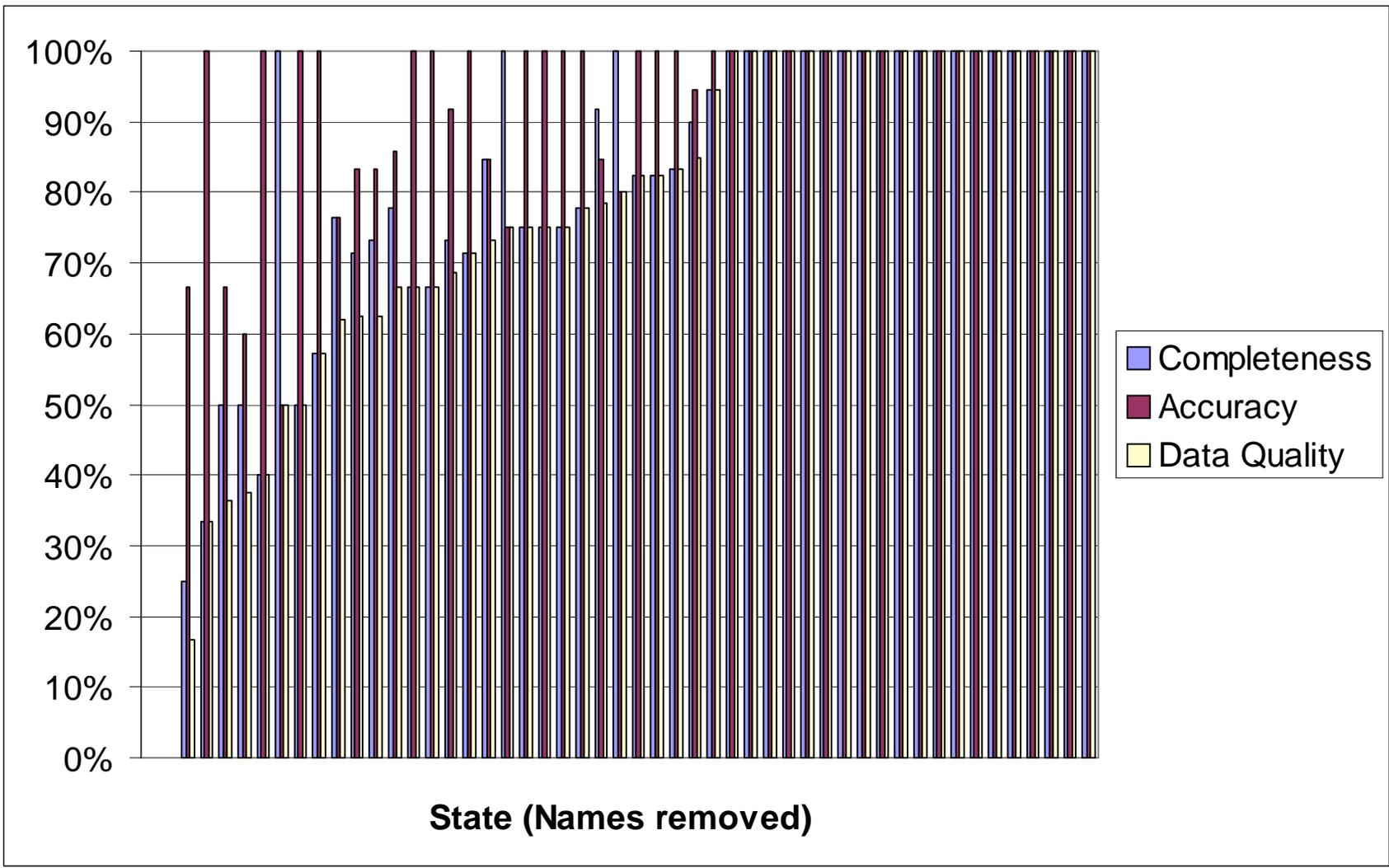


Data Verification of SDWIS Accuracy and Completeness Overview

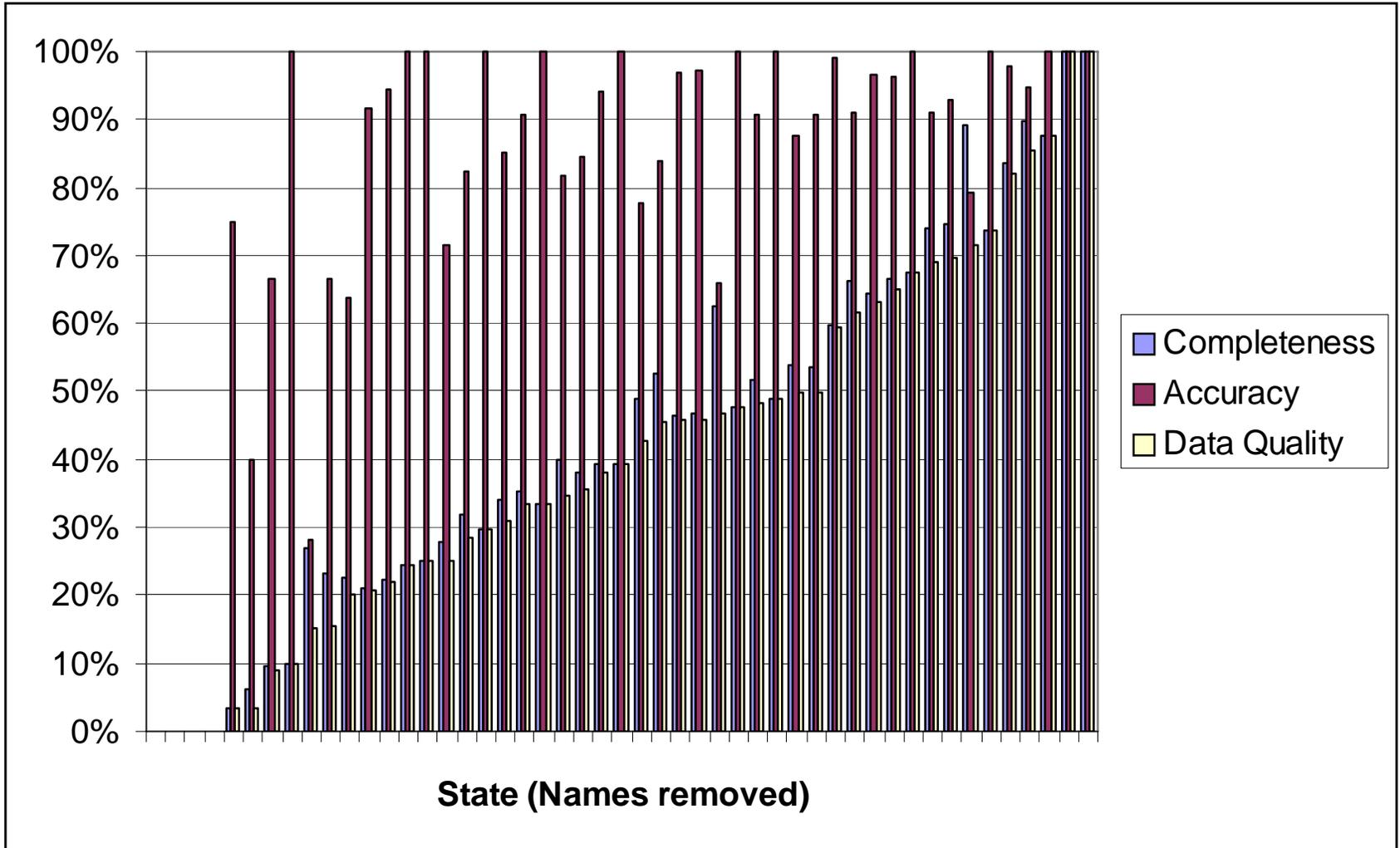
- Health-based Violations (MCLs)
 - 81% Complete
 - 93% Accurate
- Monitoring and Reporting-based Violations
 - 41% Complete
 - 89% Accurate



Data Quality for MCL Violation Reporting for all Years



Data Quality for MR Violation Reporting for all Years



Percentages of CWSs with MCL Violations from 1998 to 2005 – System Size and Source Type

		Population Served		
		<3,301	3,300-100k	>100k
Nonacute MCL Violation	Source Water Type			
		GW	25.9%	29.9%
	SW	13.9%	21.0%	7.3%
Acute MCL Violation	Source Water Type			
	GW	3.7%	3.3%	7.1%
	SW	4.0%	3.0%	4.4%

