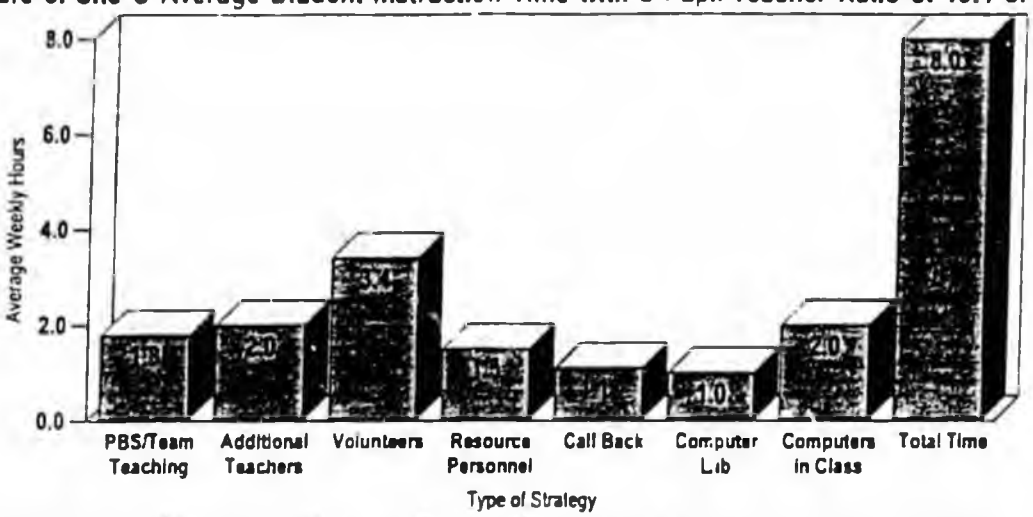
The teachers' daily records allow us to make an estimate of time the average student spent in reduced size classes in 1995-96. As Figure 5 shows, an average student at Site B had approximately 8 hours per week of small-group instruction time.

Figure 5. Site C Average Student Instruction Time with a Pupil-Teacher Ratio of 15:1 or Less



Note: There are times when multiple strategies are taking place. As a result, the sum of the strategies is greater than the total time shown with reduced PTR.

Goal 6: Improving home-school communication

> *The home-school link has been a strong part of [this school's] grant. More parents are in the building, and they [appear to be] more comfortable working and visiting in the school. We have in-service training on parent meetings to help create and build that relationship.* (First-grade teacher)

> *If letters do not get home parents now call to find out what happened. The parents feel much freer to walk into the building and start helping the teacher. It appears so many know what is going on in the school. While I always sent home a newsletter, I never had parents calling to ask if their child did not bring it home or if something in the letter was not clear. I know they are interested in what is going on in their child's classroom.* (Second-grade teacher)

The parent volunteer coordinator credits the openness and receptive nature of the teaching staff and the training component as most significant factors in improving home-school communication. The benefits were far-reaching as parents who participated in the school became its advocates in the community and students' self-esteem increased as they watched their parents working with their teachers. Teachers and administrators must recognize that parents can initially be reluctant or even fearful about coming into a school and will appreciate the offer of training and a welcoming reception.

Table 15 shows the percentage of parents who were aware of the project components and who felt the project had a positive impact on their children's education. A total of 87 percent reported the computer-assisted instruction as having a positive impact on their children's education, followed by 70 percent for the volunteers and 63 percent for team teaching. Fifty percent reported assisting their children's teacher with school activities. These figures remained relatively consistent throughout the grant. The major change was in the area of computer use where, for the 1994-95 school year, only 55 percent were aware of computer use at school and 58 percent felt computers had a positive impact on the school. The increase in student use this final grant year was a major reason for this change.

Table 15. Site B Parents' Awareness of and Involvement in the Project

Project Component	Percent Aware of Project Component	Percent of Those Aware of Project Who Feel Project Has Had Positive Impact
Team teaching	73%	63%
Collaborators with teachers	57%	46%
Split specials	59%	58%
Volunteers	80%	70%
Computer-assisted instruction	92%	87%
Parent Involvement		**Percent**
Volunteered to work with students in the classroom		42%
Assisted child's teachers and/or participated in PTA-related activities		50%
Received Volunteer Training		22%
Feel comfortable in role as volunteer.		94%
Number of parents responding = 143		

Thirty-six percent of the parents responding to the survey had children attend Site B before the start of the *Elementary School Class Size Reduction Pilot Project*. Of this group, 59 percent felt that the program offered to their child was better in 1995-96 because of the project; 35 percent were undecided (see Table 16).

Table16. Site B Percent of Parents with Child in a Non-Grant Class During the 1993-94 School Year Who Feel the Program is Better Because of the Grant

	Percent
Yes	59%
No	1%
Don't Know	35%
Number of parents responding = 52	

Parent Comments

The following is a representative list of parents' comments on the *Elementary School Class Size Reduction Pilot Project*:

Positive

- Anything that brings the teacher/pupil ratio closer to one is a benefit to the kids.
- It is my opinion that smaller class size benefits both the teacher and student academically, psychologically, and emotionally.
- I have been very pleased with the project impact. My child is able to read at his own speed and can progress as quickly or slowly as he is able. This is due solely to having an adult listen to him individually every day. That would not be possible without the project.
- My child is very excited about school and I feel this is due to the programs [Site B] has with the grant. I feel the volunteer coordinator is extremely effective and important. She has made it possible to get parent volunteers to come in and become involved at their child's school. I feel this is a very important part of a child's academic career. To have their parents involved and knowing what is going on at school is a huge advantage. I am impressed with [Site B]!

- I feel it is a good program. The children are less easily distracted and respond positively to the special attention time provided them. I am sorry this is the last year of the project.
- Splitting the classes into smaller groups whenever possible is very beneficial to the kids. I love being able to assist in the classroom. The computer time and Internet for the kids are great! This school needs an art class all year long!
- As a former teacher, I have been in quite a few elementary schools. Site B definitely stands out as the best I have ever seen. The use of collaborators, volunteers, and split specials really benefits the children. Smaller class size as well as more adults per child assures all children will receive the attention and instruction they need. Site B is #1 in my book!
- I have enjoyed the opportunity to help in my child's class. The training set me at ease and the teachers are very encouraging to the parents.

Negative

- I do not get this class size project? Class sizes have not decreased at all! I see an increase. As for all this class size project all I see is a greater need for volunteers. The way classrooms are working it seems too much is going on for one teacher to teach.

Parent Survey Results

Parents described their perceptions about Site B as positive. Ninety-six percent of respondents said their children enjoy school; 98 percent knew how their children were doing at school; 94 percent were pleased with the school's effort to communicate with them; 75 percent felt the project provided opportunities for them to be involved in their children's education; and 60 percent said the changes made in the school program as a result of the grant improved their children's attitude toward school (Table 17). For all three years of the project, more than 90 percent of parents agreed with the statements, "My child enjoys coming to school," "I know how my child is doing at school," and "I am pleased with the school's communication efforts."

Table 17. Site B Parents' Perceptions About the School

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	No Answer
My child enjoys coming to school.	62%	34%	3%	0%	0%	1%
The project has provided opportunities for me to get involved in my child's education.	41%	34%	18%	3%	3%	1%
Changes to the school program, as a result of the project, have improved my child's attitude toward school.	32%	28%	34%	1%	1%	4%
I feel I know how my child is doing at school.	64%	34%	1%	0%	1%	0%
I am pleased with the school's communication efforts.	55%	39%	5%	1%	0%	0%
Number of parents responding = 143						

Goal 7: Provide training in the arts for students, staff, and parents.

The initial plan called for a collaborator/arts and humanities coordinator. This coordinator would have been scheduled 4 days per week to work with all kindergarten teachers during language arts, reading, and mathematics instruction time and one day per week planning the arts/humanities curriculum. This goal was dropped after the first year due to budgetary restrictions. However, the commitment to the arts and humanities remained strong with this group of teachers, and they continued to promote this component of the grant.

During the 1994-95 and 1995-96 school years, staff development opportunities were available to assist teachers with integrating arts and humanities into the everyday curriculum. Teachers who attended conferences, often at their own expense, shared the training and ideas informally and during staff development days. Two examples of training sessions they attended include celebration of culture (a week-long multicultural event) and an Orff music institute promoting an instructional methodology emphasizing the integration of music, language arts, mathematics, and movement for primary students. The music te her at this site was the primary force behind this methodology and served as a formal and informal resource for staff.

The humanities' coordinator joined the staff as a part-time kindergarten teacher in 1995-96 and, like the music teacher, served as an informal resource person promoting the integration of the arts throughout the curriculum.

2. What instructional innovations in reading and mathematics are schools using along with class size reduction?

Instructional innovation at Site B emphasized increased use of developmentally appropriate experiences for small groups and one-on-one instruction when needed. Learning centers increased and were most frequently staffed by volunteers in the classroom. Teachers reported that without additional adult assistance, the centers were not as effective. With adult assistance they were able to integrate the subject areas and include more complex lessons requiring critical thinking skills.

Many teachers improved their approaches to reading—for example, the book immersion program, in which students were divided into three groups and the teacher rotated around the groups and listened to each child read one book. The children then took turns reading to the other students in their group. By the end of the week, the had all read aloud a minimum of six to seven books, and teachers reported they understand what they read. The teachers could not have effectively accomplished this strategy with the whole class.

All classes in the project used a variety of teaching strategies throughout the day. Teaching strategie documented in weekly logs and observed by the evaluator included guided practice, team-teaching, computer-assisted instruction, cooperative learning, whole- and small-group instruction, peer tutoring, learning centers, and independent work (see Table 18).

All participants emphasized small group instruction, often with a PTR of 6:1 or less. Data from teachers' weekly logs show the strategies used and the number of weeks they were used (Table 18).

Training video tapes were made available for parents to check out and view at home. Weekly newsletters were also produced for volunteers. Monthly meetings were scheduled so all volunteers could get together.

During the final grant year, volunteer training was available for new community members and parents wanting to work with students. The parent volunteer coordinator organized room representatives for all classroom teachers. These parents assisted with planning classroom events and scheduling volunteers. All volunteers attended a training session before they worked in the school. Administrators and teachers felt this requirement improved the overall performance of volunteers and helped acquaint parents with the rules and culture of the school.

4. What roles do parents, volunteers, tutors, and technology play in instruction?

Parents and Community Volunteers: (Refer to Question 1, Goal 4)

Tutors: (Refer to Question 1, Goal 1)

Technology: (Refer to Question 1, Goal 5)

5. How do the class size reduction and the instructional innovations affect measured language arts and mathematics achievement?

Comparative Data on Student Achievement

One of the principal goals of the *Elementary School Class Size Reduction Pilot Project* was improving student learning in math and language arts. Since students presumably learn in virtually any school program, the relevant question is whether the rate of student learning under each school's project is higher than it would have been, had the project changes not been made.

We cannot know how much students in the *Elementary School Class Size Reduction Pilot Project* would have learned, had they not been in project classrooms. Our best sources of comparison are students in other classrooms or other schools. Yet these students may benefit from other, unmeasured instructional innovations. Other students might also differ from project students in ways that cause them to learn at different rates, or they might begin their formal schooling at different levels of knowledge. Whatever comparison groups we use, then, will be imperfect. We think the best comparison group to use is other students in the United States. We wanted to see if students in the *Elementary School Class Size Reduction Pilot Project* improved their level of academic achievement over time, relative to other students in the United States.

To compare the academic achievement of project students with all U.S. students, we used tests of achievement that are applied nationally for students in second grade and individually administered norm-referenced and diagnostic tests for students in kindergarten and first grade. The three tests used to determine academic achievement include:

Iowa Tests of Basic Skills (ITBS)	These multiple choice tests are the most widely used measures of academic achievement in math and language arts. It is possible to compare individual student scores with the distribution of scores nationally.
Peabody Picture Vocabulary Test (PPVT)	These individually administered norm-referenced tests are designed primarily to measure a subject's receptive (hearing) vocabulary for Standard American English. The test provides an estimate of a student's verbal ability, and in this sense it is an achievement test since it shows the extent of English vocabulary acquisition.

KeyMath — These are individually administered diagnostic inventories of essential mathematics designed to provide a comprehensive assessment of a student's understanding of basic concepts and application of mathematics. Basic concepts assesses the foundation of knowledge on which elementary mathematics is based. Applications assesses the use of knowledge and computational skills.

The Iowa Tests of Basic Skills is a measure of student achievement. The major advantage of the Iowa Test of Basic Skills is that it is the most widely used measure of academic achievement in language arts and mathematics. With these multiple choice tests, it is possible to compare individual student's scores with the distribution of scores nationally. However, the ITBS was administered only to second graders; it was considered inappropriate for kindergartners and first graders.

The Peabody Picture Vocabulary Test (PPVT) and KeyMath assessments were selected by consensus of the project coordinators, the project evaluator, and the Department of Education. Both tests are regarded as appropriate for providing a general overview of primary students' academic achievement in language and mathematics.

To provide a baseline measure of student achievement, we worked with the school district to arrange for project students in second grade to take the Iowa Test of Basic Skills (Form K) in October 1993 and another version of the test in April 1994 and 1995 and Winter 1996. The producers of the test, Riverside Publishing, scored the results and provided data tapes for analysis. This report provides a comparison of achievement of the students who took the Fall 1993 tests and Winter 1996 tests.

Students in kindergarten and first grade were given individually administered norm-referenced and diagnostic tests in the Fall of 1994 and Spring of 1995 and 1996. Classroom teachers administered and scored the tests and ISER performed the analysis of these test results.

The State of Alaska reports statewide and district testing results in terms of national percentile ranks. We used national percentile ranks and grade equivalent to measure the ITBS and KeyMath results of project students relative to all U.S. students. We used percentile rank as a measure of academic achievement for students taking the PPVT. We tracked the math and language arts achievement of individual students in each project school. An analysis of academic growth as measured by these tests for all students—and at-risk students, where numbers of students were sufficient—were analyzed separately. [At-risk students are those identified as having increased probability for school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), or English as a Second Language.] A description of these methods of reporting test results follows.

National Percentile Rank — Indicating the percentage of students taking the test nationally who scored lower on the test than the individual student.

Grade Equivalent — Indicating the year and month of schooling of students nationally that corresponds with the student's test performance. By comparing the student's actual grade level (e.g., 4.2 years) with the grade equivalent (e.g., 4.6 years) it is possible to tell if the student is learning faster or slower than students in the U.S. as a whole.

All kindergarten, first, and second grade students at Site B participated in the *Elementary School Class Size Reduction Pilot Project.* Students in kindergarten and first grade were tested using Peabody Picture Vocabulary Test (PPVT) and KeyMath assessments in Fall 1994 and Spring 1995. These same students were given the Iowa Test of Basic Skills (ITBS) in the Spring of 1996, when they reached

second grade—but we have no additional ITBS scores to allow an analysis of changes over time for those students.

Second grade students were tested using the Iowa Test of Basic Skills (ITBS) in Fall 1993 and Spring 1994, 1995, and 1996. Grade cohort represents the year of school the student was in during the 1993-94 school year. Thus, in the 1995-96 school year, the second grade cohort students were in the fourth grade.

Test results should be interpreted with caution. The period of time between administration of pre- and post-tests for the KeyMath and PPVT is 18 months and for the ITBS 28 months—relatively short periods to use in assessing the impacts of the project.

National percentile rank, an average for students taking the test nationally, increased for kindergarten and first grade students. Students in the kindergarten and first grade cohorts were not given either KeyMath or PPVT in the Spring of 1996; instead they took the ITBS in Spring of 1996—so we have no comparative data (Table 19).

Table 19. Site B KeyMath National Percentile All Students

Key Math			NATIONAL PERCENTILE			
			Basic Concepts		Applications	
School	Grade Cohort	No. Students Tested	Fall 94	Spring 95	Fall 94	Spring 95
Site B	K	129	45	59	46	57
	1	156	43	78	43	71

Table 20 shows the national percentile rank for at-risk students in kindergarten and first grade at Site B. Results show an increase in the percentile rank for both grades from Fall 1994 to Spring 1995.

Table 20. Site B KeyMath National Percentile At-Risk Students

Key Math			NATIONAL PERCENTILE			
			Basic Concepts		Applications	
School	Grade Cohort	No. Students Tested	Fall 94	Spring 95	Fall 94	Spring 95
Site B	K	46	32	47	35	46
	1	59	28	64	31	62

All students at Site B demonstrated an increase in grade equivalent. The mean change in scores on basic concepts for kindergarten students was eight months and for first grade students the change was one year, six months. On applications the mean change for kindergarten students was six months and for first grade students one year, five months. (See Table 21.)

Table 21. Site B KeyMath Grade Equivalent All Students

Key Math			GRADE EQUIVALENT					
			Basic Concepts			Applications		
School	Grade Cohort	No. Students Tested	Fall 94	Spring 95	Mean Change	Fall 94	Spring 95	Mean Change
Site B	K	111	.3	1.0	.8	.1	.8	.6
	1	126	[illegible]	2.4	1.6	.7	2.3	1.5

At-risk students in kindergarten and first grade at Site B increased an average of one year in grade level on basic concepts and one year, one month on applications. (See Table 22.)

Table 22. Site B KeyMath Grade Equivalent At-Risk Students

Key Math		GRADE EQUIVALENT	
		Basic Concepts	Applications
School	No. Students Tested	Mean Change	Mean Change
Site B	111	1.0	1.1

Table 23 shows the national percentile rank of PPVT test results for kindergarten and first grade. The percentile rank increased for both grades.

Table 23. Site B PPVT Percentile Rank All Students

PPVT			PERCENTILE RANK	
School	Grade Cohort	No. Students Tested	Fall 94	Spring 95
Site B	K	126	29	54
	1	150	56	60

At-risk students in kindergarten demonstrated an increase in national percentile rank, and first grade students maintained the same percentile rank from Fall 1994 to Spring 1995. (See Table 24.)

Table 24. Site B PPVT Percentile Rank At-Risk Students

PPVT			PERCENTILE RANK	
School	Grade Cohort	No. Students Tested	Fall 94	Spring 95
Site B	K	40	14	34
	1	63	40	40

On average, national percentile rank for the second grade cohort at Site B increased 6 points in mathematics, 17 points in reading, and 8 points in language arts from Fall 1993 to Winter 1996. (See Table 25.)

Table 25. Site B ITBS National Percentile Rank

ITBS			NATIONAL PERCENTILES					
			Math		Reading		Language Arts	
School	Grade Cohort	No. Students Tested	Fall '93	Winter '96	Fall '93	Winter '96	Fall '93	Winter '96
Site B	2	58	41	47	30	47	31	39

Table 26 shows the national percentile rank for at-risk students in second grade at Site B. Scores decreased in percentile rank in mathematics, and increased in percentile rank in reading and language arts, from Fall 1993 to Winter 1996.

Table 26. Site B ITBS National Percentile Rank At-Risk Students

ITBS		NATIONAL PERCENTILE					
		Math		Reading		Language Arts	
School	No. Students Tested	Fall 93	Winter 96	Fall 93	Winter 96	Fall '93	Winter 96
Site B	17	40	31	22	32	26	29

The second grade cohort at Site B demonstrated a mean increase in mathematics of two years, six months in grade equivalent from Fall 1993 to Winter 1996. (See Table 27.)

Table 27. Site B ITBS Grade Equivalent Mean Change All Students Math

School	Grade Cohort	No. Students Tested	Fall '93	Winter '96	Mean Change Fall 93-Winter 96
Site B	2	58	2.1	4.6	2.6

The second grade cohort at Site B demonstrated a mean increase in reading of two years, five months in grade equivalent from Fall 1993 to Winter 1996. (See Table 28.)

Table 28. Site B ITBS Grade Equivalent Mean Change All Students Reading

School	Grade Cohort	No. Students Tested	Fall '93	Winter '96	Mean Change Fall 93-Winter 96
Site B	2	58	2.1	4.5	2.5

The second grade cohort at Site B demonstrated a mean increase in language arts of two years, four months in grade equivalent from Fall 1993 to Winter 1996. (See Table 29.)

Table 29. Site B ITBS Grade Equivalent Mean Change All Students Language Arts

School	Grade Cohort	No. Students Tested	Fall '93	Winter '96	Mean Change Fall 93-Winter 96
Site B	2	58	1.8	4.1	2.4

The at-risk second grade cohort at Site B showed an average increase in grade equivalent of two years, one month in mathematics, reading, and language arts from Fall 1993 to Winter 1996. (See Table 30.)

Table 30. Site B ITBS Grade Equivalent Mean Change At-Risk Students

ITBS		GRADE EQUIVALENTS		
School	No. Students Tested	Math Mean Change Fall 93-Winter 96	Reading Mean Change Fall 93-Winter 96	Language Arts Mean Change Fall 93-Winter 96
Site B	17	2.1	2.1	2.1

We made the following assumptions in calculating the mean program cost per classroom for Site B:

- Support staff and extra-duty compensation expenditures were used to perform grant administrative tasks and therefore were considered project and not program costs.
- An estimated 75 percent of staff development was used to develop a vision of the project. Therefore, those expenditures providing for staff development—substitutes, professional/technical services, travel, and other expenses—were calculated at a 25 percent rate.
- Capital supplies and capital equipment purchases (computer purchases) were assumed to have a use-life of eight years.

SUMMARY

The staff at Site B successfully implemented all their initial project goals. Their commitment to supporting a developmentally appropriate learning environment, assessing teaching strategies and approaches to learning, and providing a quality education for all the students unified this conscientious staff. Dialogue among staff, administration and parents flourished from the initial planning phase of the grant, when approaches to learning were evaluated and researched and priorities were assessed. The opportunity to reflect, critique, and defend existing educational practices contributed to a positive learning environment throughout the three years of the grant.

The staff at Site B valued the educational leadership, support, and vision from their principal. They appreciated her ability to share the leadership necessary to make the project work over the past three years. This administrative support, professional commitment to improving education, and increased community involvement supported the staff's and parents' commitment to the overall goals of the grant.

The three years of the grant were not, however, trouble-free. Some drawbacks included the stringent time constraints with tightly established schedules, shortage of space for the small groups, lack of adequate planning time, excessive paperwork required to document progress, and the overall additional time commitment necessary to make the whole process fall together. Compromises to the initial grant proposal were made along the way, resulting from conflicts between priorities and budgets. All modifications were made with considerable debate and involvement of staff.

The positive benefits of the grant outweighed the negative ones. Student gains in academic achievement, improved behavior and attitude, opportunities for improving existing technology, training, and additional teachers/collaborators were all welcome additions to the school. The staff at Site B appreciated the opportunity to demonstrate to the State of Alaska what can be accomplished with additional funds to support a well-planned, research-based, all-inclusive school improvement plan.

- An additional multimedia station was set up—with three computers, a scanner, a digital video camera, a color printer, and a laser disk player and a video camcorder which students could use to import and export video images to and from the computers.
- *Portfolio Assessment Toolkit* , software for the creation of student electronic portfolios, was available to the students.
- Thirty-two Alpha Smarts (portable word processors) were purchased.
- An additional Apple IIe/GS lab with Apple II computers was set up.

Staff Development

The focus of staff development for the 1995-96 school year continued to be technology. The opportunities for staff development provided the teachers with the skills to integrate technology into their daily lessons. The technology coordinator provided on-site and frequent training to teachers and students. A math assessment workshop, language arts assessment, Rubric training, and Glasser's (Quality Schools Programs) were also part of the staff development sessions.

PROJECT OUTCOMES

This segment of the report answers seven research questions proposed by the Alaska Department of Education at the start of the *Elementary School Class Size Reduction Pilot Project.* In preparing this section, we used project documentation and evaluation activities completed between Fall 1993 and Spring 1996; those examined student academic achievement and attitude, school climate and discipline, teacher innovation, and parental involvement.

1. Did the program at Site C meet its class size goals?

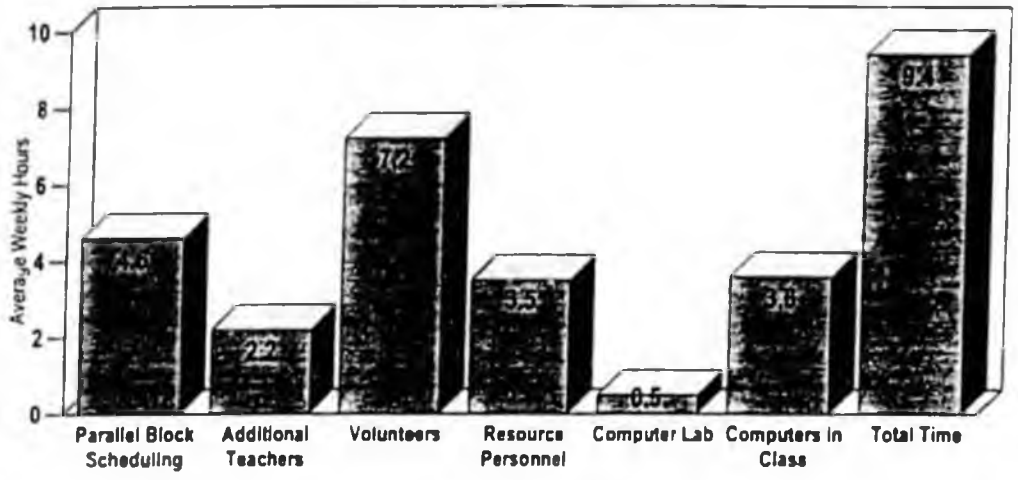
Goal 1: Lowering the PTR to improve academic achievement in math and language arts by adapting instructional practices, integrating technology with the curriculum, and implementing parallel block scheduling.

Yes, I feel like I did a very good job. I did a better job this year than the first two years. This year I am team teaching and we do computer lab splits during which time we have parents who come in to work in the computer lab or in the room. This increases our lower PTR time. (Fourth-grade teacher)

All teachers at Site C successfully reduced PTR during language arts and mathematics instruction time. In addition to improving instructional strategies to meet the needs of small groups of students and integrating technology into the curriculum, teachers used special service personnel, extra teachers (specialists), and volunteers to help lower the PTR. During the 1993-94 school year the average weekly PTR time was 7.6 hours, and for the 1994-95 school year it increased to 9 hours. During the final grant year teachers reported a weekly average of 9.4 hours with a PTR of 15:1 or less. (See Figure 9.)

Parallel block scheduling was a method of reducing the PTR during language arts and mathematics instruction time. Teachers preferring to keep their whole class together were able to team teach with a grade-level partner. Advantages of the parallel block scheduling included improved classroom behavior, increased student participation, and frequent assessment of students' progress. However, many teachers felt the half-hour block of reduced class time was too short and scheduling too restrictive.

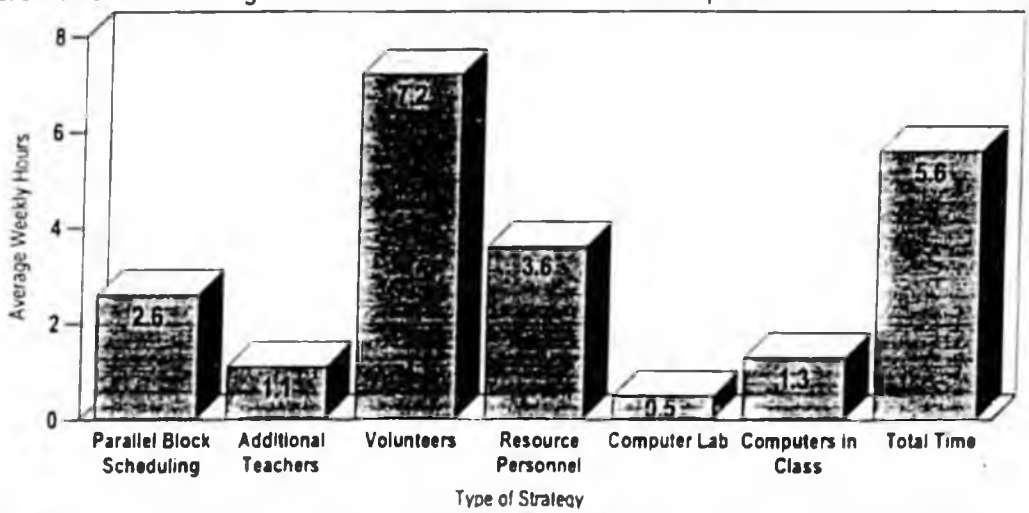
Figure 9. Site C Average First and Second-grade Teacher Weekly Instruction Time with a Pupil-Teacher Ratio of 15:1 or Less



Note: There are times when multiple strategies are taking place. As a result, the sum of the strategies is greater than the total time shown with reduced PTR. Volunteer time includes in-class and out-of-class time.

The teachers' daily records allow us to estimate the time the average student spent in reduced size classes. As Figure 10 shows, the average student had approximately 5.6 hours per week of small-group instruction time during the 1995-96 year.

Figure 10. Site C Average Student Instruction Time with a Pupil-Teacher Ratio of 15:1 or Less



Note: There are times when multiple strategies are taking place. As a result, the sum of the strategies is greater than the total time shown with reduced PTR. Volunteer time includes in-class and out-of-class time

The attention to changing instructional practices to better meet the needs of small groups of students at Site C were impressive. The extensive staff development training and peer interaction improved the instructional strategies of all staff members. Time commitment necessary to effectively plan with partners, accommodate volunteers, and increase small-group instruction was considerable.

Goal 2: Organizing and maintaining a volunteer program

Training is very important for volunteers and without the coordinator the program has had difficulties. There must be someone in charge to make the volunteer group feel cohesive. **(Fifth-grade teacher)**

I was involved in an excellent training class last year. I am delighted with the school's willingness to train and use parent volunteers. The computers give kids a great introduction to modern technology. **(Parent volunteer)**

The initial goals of establishing a well-trained and reliable volunteer force to assist the classroom teacher and lower the PTR were not met. While volunteering was extensive across the grades and volunteers were well trained, they were not reliable. However, many staff members continued to use volunteers in their classrooms; others preferred to have them assist in non-instructional areas.

The volunteer coordinator position was a critical component of the project at Site C. While the number of volunteers working in classrooms increased the final year, distribution among classes was uneven, a condition attributed to the lack of a coordinator. Some classroom teachers were more successful at recruiting than others. Favorable recruiting sites were the high school, with students participating in "work release" programs, and the college, with students interested in education; getting high school and college volunteers required extensive coordination.

A fifteen-hour volunteer training course was offered through Kenai Peninsula College during the first two years of the grant. While one hundred parents and community members attended sessions, only a few took the class for credit. Mini-training sessions were offered throughout the school year by the teachers and included strategies for working with small groups and using school equipment, as well as an overview of the philosophy and discipline policy of the school. Individual teachers reported training each new set of parents coming to work in their classrooms.

The final grant year the training sessions were dropped due to lack of participation. Staff at Site C found that many volunteers had attended extensive volunteer training at Site B (a kindergarten through second-grade district school) and did not need to repeat the sessions. Teachers appreciated the opportunity to work with volunteers and acknowledged the importance of parent involvement with their children's classroom. However, they did not recommend volunteers as a reliable and consistent way to reduce the pupil-teacher ratio.

Data collected from the teachers' weekly logs show an average of 4 parents or community volunteers spending 70 minutes per week volunteering in the classroom. This does not take into account special events where large numbers of parents were available for longer periods of time but does include individual and small group instruction in mathematics, writing, reading, language arts; editing; creative writing; general clerical assistance; reading aloud to students; computer lab assistance; guided practice; and assessment.

During the data collection period, volunteers overwhelmingly received a rating of excellent for the quality of their performance in the classroom.

Goal 3: Improving student performance as measured on ITBS scores, teachers' evaluations, portfolios, and other measures

I don't know. From a personal standpoint and looking at the students' portfolios, I believe the quality has improved. Students get more help, more immediate feedback and are more excited about learning in general. Overall this whole experience has improved their attitude toward school. **(Third-grade teacher)**

(Refer to Research Question 5.)

Using authentic assessment (observations, teacher-made tests, portfolios), the majority of teachers reported a significant improvement in academic achievement and quality of student work. Teachers report that attention to individual students needs, small groups, increased technology, and increased opportunities for classroom participation benefited the students' academic achievement. Yet, they were not confident that these gains would show up on the standardized test results. For the 1994-95 school year, teachers reported academic achievement as a result of reduced class size to be good 56 percent of the time and excellent 36 percent of the time and for the 1995-96 school year, good 62 percent of the time and excellent 37 percent of the time.

Goal 4: Improving student attitude and behavior

Attitude and behavior improved 100 percent. The self-esteem program, "Lion's Quest," has helped. The kids are receptive about the program and are learning to work well in small groups. I believe the program has improved their attitude toward each other, toward the school, and toward what we are doing regarding the overall school behavior program. (Fifth-grade teacher)

The counselor has been excellent; she has been able to take kids out of the classroom and work with them in small groups. It will be our loss if we lose her. When we have a student in crisis, and they are not able to learn because of the crisis, I cannot help the child and ignore the rest of the class. The counselor provided critical support for these students. (Fourth-grade teacher)

All students attending the third, fourth, and fifth-grade classes at Site C completed a survey on their perception of school and learning at the end of the 1993-94, 1994-95, and 1995-96 school years. The survey asked for information on attitude toward learning and school. While student mobility rates (moving in and out of the school) restrict comparisons, survey results showed students in participating classes having positive and favorable attitudes toward school. Table 35 shows students' responses to questions about their attitudes toward school and learning.

Asked if they liked school, 36 percent of the students responded "always," and 57 percent responded "sometimes." The responses about whether they liked reading and math were positive. Ninety-seven percent of students reported feeling school is a safe place, and only 3 percent reported not feeling good about how they were doing at school.

Table 35. Site C Students' Perceptions About School

	Always	Sometimes	Never	Don't Know	No Answer
Do you like school?	36%	57%	7%	0%	0%
Do you like reading at your school?	38%	54%	8%	0%	0%
Do you like doing math at your school?	51%	39%	8%	0%	0%
Do you feel your school is a safe place?	61%	36%	3%	0%	0%
Do you feel good about how you are doing at school?	54%	43%	3%	0%	0%
Do most of the kids in your class follow the rules?	16%	81%	3%	0%	0%
Number of students responding=379					

Students were also asked to describe their favorite school activity. Of all students responding, 26 percent said physical education and sports; 20 percent said mathematics; and 13 percent said arts and crafts. Other activities in order of preference included computer lab, reading, music, drama and dance, science, and spelling and writing.

All teachers reported a favorable discipline and classroom climate during periods of reduced class size. Few opportunities for disrupting classes exist when students are actively engaged in learning. Site C adopted a school-based philosophy fostering student accountability for behavior. This philosophy

extended to parents working in the building, the administrator, the teachers, and everyone in the school community. This school-wide approach toward discipline, the principal's involvement in the daily activities of all students, and the school counselor all made significant contributions to the overall improvement of school climate.

Goal 5: Increasing and promoting the creative use of technology to enhance existing instructional practices

As we near the end of the grant, it is clear to this writer that Site C is a vastly different school than it was three years ago. Technology use is ubiquitous and becoming more and more 'invisible.' By that I mean that students and teachers are thinking less about how to use different technologies, they are just using them when appropriate. Many teaching styles are evolving toward a more student-centered approach. Site C is a dynamic, exciting place in which to teach and learn. I hope I get to stay next year! (Technology Specialist)

Progress during the last two years of the grant in the area of technology was extensive, and at the close of the final grant year it was a natural part of the students' and teachers' workday. Besides the extensive technology available in the classrooms, all students were required to train on keyboard at least 15 to 20 minutes, four days per week.

The technology coordinator— a half time position supported by the district office since the second year of the grant— was a critical component for success. Without this position, the technology would not have been as effective and perhaps would have failed. The on-going support, availability of weekly training sessions, and consistent on-site expertise available to students and teachers kept the project going smoothly. The most important lesson learned regarding technology is that a school must have a specialist on staff to support all the components—training, equipment and programs. Without this constant assistance, technology can be overwhelming.

At the close of the 1995-96 school year, staff and students were proud of their accomplishments. After three years, teachers who initially protested the use of technology in the classroom could not imagine teaching without using technology. By the end of the project, Site C could access the Internet from all classrooms and had begun work on their World Wide Web home page.

2. What instructional innovation in reading and mathematics did schools use along with class size reduction?

I do more cooperative teaching instead of using texts and worksheets. I am able to individualize the math program this year and I can easily follow a student's progress. (Fifth-grade teacher)

This week I attempted to do a math lesson with all 26 students. We are all so used to working in small groups that everyone—parents, students and I—were finding it hard to adjust. Instead of helping 5 students in a small group, I was overwhelmed by all of them. Now that we are in our routine of small group time, it's very difficult to go back to the large groups. (Fourth-grade teacher)

All classes in the project used a variety of teaching strategies throughout the day. Teaching strategies documented in weekly logs and observed by the evaluator include guided practice, team-teaching, computer-assisted instruction, cooperative learning, whole- and small-group instruction, peer tutoring, learning centers, and independent work. All participants emphasize small-group instruction, often with a PTR of 6:1 or less. Data collected for teachers' weekly logs showed strategies used and the number of weeks they were used in the classroom (Table 36).

office, and library). The volunteers operated a "parents' room" with a lending library that included materials to support and sponsor programs that enhance teaching and parenting practices.

A five-week training course was offered to volunteers through the local college. During the second and third year of the grant, five sessions were spread out among monthly meetings. Parent training sessions covered topics on classroom management, working with computers, questioning techniques, cooperative learning strategies, and small-group strategies on math and reading. Volunteer meetings were coordinated through the PTA volunteer coordinator, and classroom teachers were encouraged to recruit their volunteers to attend the monthly mini-lessons.

4. What roles do parents, volunteers, tutors, and technology play in instruction?

Parent/Volunteers (Refer to Research Question 1, Goal 2)

Tutors

The special education tutors, including special service teachers and Chapter 1 aides, assisted the special needs children either in the classroom or in "pull-out" situations, where they were removed from the classroom and taught in small groups with other special needs students. This extended use of resource personnel served to assist the classroom teacher in lowering the PTR and to assist the special needs child in the classroom with his or her peers. The tutors were accountable to the regular classroom teacher and become involved in team teaching by working with regular as well as special education students. While they were able to assist with small-group instruction in the classroom, their main focus was attending to the students qualifying for special services.

During the 1993-94 school year, the special service personnel provided for an average of 3.6 hours per week of reduced PTR time for the classroom teacher. Reduced PTR time was 2.5 hours for the 1994-95 school year and 3.6 hours in 1995-96.

Technology (Refer to Question 1, Goal 5)

5. How did the class size reduction and the instructional innovations affect measured language arts and mathematics achievement?

Comparative Data on Student Achievement

One of the principal goals of the *Elementary School Class Size Reduction Pilot Project* was improving student learning in math and language arts. Since students presumably learn in virtually any school program, the relevant question is whether the rate of student learning under each school's project is higher than it would have been had the project changes not been made.

We cannot know how much students in the *Elementary School Class Size Reduction Pilot Project* would have learned, had they not been in a project classroom. Our best sources of comparison are students in other classrooms or other schools. Yet these students may benefit from other, unmeasured instructional innovations. Other students might also differ from project students in ways that cause them to learn at different rates, or they may begin their formal schooling at different levels of knowledge. Whatever comparison groups we use, then, will be imperfect. We think the best comparison group to use is other students in the United States. We wanted to see if students in the *Elementary School Class Size Reduction Pilot Project* improved their level of academic achievement over time, relative to other students in the United States.

To compare the academic achievement of project students with all U.S. students, we used the Iowa Tests of Basic Skills (ITBS) for students in grades three through five. These multiple choice tests are the most widely used measures of academic achievement in math and language arts. It is possible to compare individual student scores with the distribution of scores nationally.

To provide a baseline measure of student achievement, we worked with the school district to arrange for project students in grades 3-5 to take the Iowa Test of Basic Skills (Form K) in October 1993 and another version of the test in April 1994 and 1995 and Winter 1996. The producers of the test, Riverside Publishing, scored the results and provided data tapes for analysis. This report provides a comparison of achievement of the students who took the Fall 1993 tests and Winter 1996 tests.

The State of Alaska reports statewide and district testing results in terms of national percentile ranks. We used national percentile ranks and grade equivalent to measure the ITBS test results of project students relative to all U.S. students. We tracked the math and language arts achievement of individual students in each project school. We analyzed academic growth as measured by these tests for all students, and—where numbers of students were sufficient—for at-risk students. At-risk students are identified as having increased probability for school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), or English as a Second Language. A description of these methods of reporting test results follows.

National Percentile Rank	Indicating the percentage of students taking the test nationally who scored lower on the test than the individual student.
Grade Equivalent	Indicating the year and month of schooling of students nationally that corresponds with the student's test performance. By comparing the student's actual grade level (e.g., 4.2 years) with the grade equivalent (e.g., 4.6 years) it is possible to tell if the student is learning at a faster or slower rate than students in the U.S. as a whole.

All third, fourth, and fifth grade students in Site C participated in the *Elementary School Class Size Reduction Pilot Project.* Students in grade three took the ITBS in Fall 1993, Spring 1994, Spring 1995, and Winter 1996. Students in grade four took the ITBS test in Fall 1993 and Spring 1995. Students in grade five took the ITBS test in Fall 1993 and Spring 1994. Fourth grade students took state administered tests in Spring 1994. Students who had been in fifth grade at the start of the project were no longer attending school at Site C in Spring 1995. Grade cohort represents the year of school the student was in during the 1993-94 school year. Thus, in the 1995-96 school year, the original third grade cohort students were in the fifth grade.

Test results should be interpreted with caution. The period of time between administration of pre- and post-tests for the ITBS test is 28 months, a relatively short period on which to base conclusions about the impact of the project.

Table 37 shows the national percentile rank of students at Site C. On average, students in the third grade cohort increased their percentile rank in math and language arts and decreased their percentile rank by one percent in reading from Fall 1993 to Winter 1996. Fourth grade students increased the percentile rank in all subjects tested from Fall 1993 to Spring 1995; and fifth grade students increased their percentile rank in math, reading, and language arts from Fall 1993 to Spring 1994.

Table 37. Site C ITBS National Percentile All-Students

ITBS School	Grade Cohort	No. Students Tested	NATIONAL PERCENTILES Math Fall 93	Math Spring 94	Math Spring 95	Math Winter 96	Reading Fall 93	Reading Spring 94	Reading Spring 95	Reading Winter 96	Language Arts Fall 93	Language Arts Spring 94	Language Arts Spring 95	Language Arts Winter 96
Site C	3	112	47				58			57	42			49
	4	121	53		55		54		58		39		46	
	5	122	53	61			56	63			45	51		

Table 38 shows the national percentile rank for the at-risk student at Site C. Results showed no change in percentile rank for math and language arts and a decrease in percentile rank for reading from Fall 1993 to Winter 1996.

Table 38. Site C ITBS National Percentile At-Risk Students

ITBS School	No. Students Tested	NATIONAL PERCENTILES Math Fall 93	Math Winter 96	Reading Fall 93	Reading Winter 96	Language Arts Fall 93	Language Arts Winter 96
Site C	26	34	34	36	29	24	24

On average, students at Site C demonstrated an increase in grade equivalent in math. The third grade cohort increased two years, seven months from Fall 199_ to Winter 1996; fourth grade students increased two years from Fall 1993 to Spring 1995; and the fifth grade cohort increased one year, three months from Fall 1993 to Spring 1994. (See Table 39.)

Table 39. Site C ITBS Grade Equivalent Mean Change All Students Math

School	Grade Cohort	No. Students Tested	Fall 93	Spring 94	Spring 95	Winter 96	Mean Change Fall 93-Spring 94	Mean Change Fall 93-Spring 95	Mean Change Fall 93-Winter 96
Site C	3	112	3.2			5.9			2.7
	4	121	4.4		6.4			2.0	
	5	122	5.5	6.8			1.3		

On average, students at Site C demonstrated an increase in grade equivalent in reading. The third grade cohort increased two years, six months from Fall 1993 to Winter 96; and the fourth grade cohort increased two years from Fall 1993 to Spring 1995. (See Table 40.)

Table 40. Site C ITBS Grade Equivalent Mean Change All Students Reading

School	Grade Cohort	No. Students Tested	Fall 93	Spring 94	Spring 95	Winter 96	Mean Change Fall 93-Spring 95	Mean Change Fall 93-Winter-96
Site C	3	112	3.6			6.2		2.6
	4	121	4.5		6.5		2.0	
	5	122	5.7	6.8				

On average, students at Site C demonstrated an increase in grade equivalent in language arts. The third grade cohort increased two years, eight months from Fall 1993 to Winter 1996; the fourth grade cohort increased two years, two months from Fall 1993 to Spring 1995; and the fifth grade cohort increased one year, two months from Fall 1993 to Spring 1994. (See Table 41.)

Table 41. Site C ITBS Grade Equivalent Mean Change All Students Language Arts

School	Grade Cohort	No. Students Tested	Fall 93	Spring 94	Spring 95	Winter 96	Mean Change Fall 93-Spring 94	Mean Change Fall 93-Spring 95	Mean Change Fall 93-Winter 96
Site C	3	112	3.0			5.9			2.8
	4	121	3.9		6.1			2.2	
	5	122	6.5	6.5			1.2		

At-risk students at Site C demonstrated an increase in grade equivalent. The mean change from Fall 1993 to Winter 1996 for students in math was two years, four months, and in reading and language arts one year, nine months. (See Table 42.)

Table 42. Site C ITBS Grade Equivalent Mean Change At-Risk Students

ITBS School	No. Students Tested	GRADE EQUIVALENTS Math Mean Change Fall 93-Winter 96	Reading Mean Change Fall 93-Winter 96	Language Arts Mean Change Fall 93-Winter 96
Site C	26	2.4	1.9	1.9

6. How are parental involvement, teacher satisfaction, and student attendance and behavior affected by the class size reduction and associated instructional innovations?

Parental Involvement

Parents of students attending Site C have been involved with the grant since the initial planning stage. They were kept informed of grant activities through routine and frequent home-school communication and through the PTA. Surveys were conducted at the end of each grant year to assess parents' awareness of and involvement in the project, parents' opinions regarding the grant's effect on the school program, and parents' perceptions about the school.

Table 43 shows the percentage of parents who were aware of the project components and who felt the project had a positive impact on their children's education. Sixty-six percent reported the computer-assisted instruction had a positive impact on their children's education, followed by 59 percent who felt volunteers had a positive impact and 51 percent who thought parallel block scheduling had. Fifty-two percent reported assisting teachers with school activities, and 29 percent reported working with students in the classroom.

student learning above the national average. If the change in grade equivalent occurred over a time period of 1.9 (one year and nine months), this would indicate achieved student learning below the national average. Finally, if a 1.8 change in grade equivalent occurred over a time period of 1.8 months, this indicates achieved student learning equal to the national average.

The study then compared the mean change in grade equivalent on the Iowa Tests of Basic Skills (ITBS) to the project's estimated mean program cost per classroom. The following table displays the mean change in grade equivalent in mathematics, reading, and language arts for a third grade cohort that participated in Site C's *Elementary Class Size Reduction Pilot Project* from Fall 1993 to Winter 1996.

Table 48. Site C Mean Change in Grade Equivalent

Discipline	Time Period	Grade Equivalent	Number of Classrooms in Project	Mean Program Cost Per Classroom
Mathematics	2.4	2.7	18	$5,883
Reading	2.4	2.6	18	$5,883
Language Arts	2.4	2.8	18	$5,883

Estimated Mean Program Cost per Classroom

Site C's mean program cost per classroom was estimated by: (1) differentiating program costs from project costs, and (2) allocating capital expenditure costs over the use-life of the investment. The purpose for differentiating between program and project costs was to identify *ongoing* costs, or costs that will continue to be present as the program continues, from *startup* or grant imposed costs. Program costs were defined as those costs necessary to the ongoing operation of Site C's Class Size Reduction Project. Under this definition, items such as administrative costs imposed by the grant or startup costs associated with designing the program were not included in calculating the annual program cost. Second, capital expenditures, such as purchasing computers, were spread out over the use-life of the investment in order to avoid overestimating annual program costs.

We made the following assumptions in calculating the mean program cost per classroom for Site C:

- Support staff were hired to perform grant administrative tasks and therefore were considered a project and not a program cost.
- An estimated 75 percent of staff development was used to develop a vision of the project. Therefore, those expenditures providing for staff development—substitutes/temporaries, professional/technical services, travel, stipends, postage, telephone, supplies, and other purchased services—were calculated at a 25 percent rate.
- Capital equipment purchases (computer purchases) were assumed to have a use-life of eight years.

SUMMARY

Elementary School Class Size Reduction Pilot Project at Site C was successfully implemented according to the original proposal. Concurrent scheduling changes, staff development, and increased personnel assisting in the classroom created a difficult and frustrating first year for the majority of teachers. They learned that they had attempted to do too much too soon. The second and third year of the grant allowed for improvements and revisions that enabled the staff to adjust to the most significant features of the grant—scheduling changes, new instructional practices, and technology.

The addition of a half-time technology specialist for the 1994-95 and 1995-96 school years provided the staff with much-needed assistance in integrating new technology into the curriculum. Staff members, representing a wide range of computer literacy (from no skills to very skilled, needed more than after-school sessions and occasional classes to get started. The additional training sessions offered to all teachers twice per month before school were a welcome opportunity to upgrade and level out the staffs' computer skills. Focusing staff development on technology also eased the tension and frustration of staff who were required, during the first year, to implement and adapt to schedule changes, teaching strategies conducive to small group instruction, and a new self-esteem program.

The major concerns that faced the staff were the increased planning time necessary to implement the changes, training to change their approach to teaching, working with the additional personnel in the classroom, and changing schedules to accommodate reduced PTR time. After a difficult start-up year, the staff bonded together and made revisions to support manageable change. The focus of staff development, the additional support for technology, and a more supportive principal encouraged the staff. At the close of the final grant year, the teachers were able to look back with pride on the changes and improvements in the school and in the way they teach and interact with staff and students. The highlights of the project include an increased satisfaction with teaching; improved attitude, academic achievement and behavior of the students; and creation of a team-work environment that changed the isolation of traditional classroom teaching.

The staff at Site C experienced a challenging and rewarding three years; they were satisfied that they had three years of increased opportunities to work with small groups of students. Project success was also encouraged by the improved community and parent perceptions of the school. Parents were pleased with the education their children were receiving and supported the changes made by the staff at Site C. The improved community perception, increased parental involvement, and improved educational atmosphere all served to increase teachers' willingness to change and become "partners in enthusiastic life-long learning."

All classroom teachers had six intensive training days in technology to be taken during the project. The administration encouraged teams of teachers (6 to 10 at a time) to attend training followed by an assimilation day as a group to determine how the training would be integrated into the curriculum. Regularly scheduled in-service days were used to provide teachers with the opportunity to share the information and make recommendations to the entire staff.

At the beginning of the 1995-96 school year, a questionnaire was sent to all parents asking in what ways they would be interested in participating at the school. The information went through an intense follow-through process and each parent was contacted, and options for matching needs with interests were discussed. This resulted in a schedule for parent volunteers to work each day in the lunchroom, in their children's classrooms, in other classrooms with the large numbers of students, in the office, in the computer lab, or in the library. Volunteers with young children were able to leave them in a toddler room run by parents and supported by the PTA.

Parents were presented information about volunteer involvement during a kindergarten pre-registration day held in the spring. As an increased incentive to encourage involvement, school personnel called parents of all incoming kindergarten students and parents new to Site D. To maintain continuity in the volunteer program, the volunteer coordinator trained a new parent to resume these responsibilities for the coming school year.

PROJECT OUTCOMES

This segment of the report answers seven research questions proposed by the Alaska Department of Education at the start of the *Elementary School Class Size Reduction Pilot Project.* In preparing this section we used project documentation and evaluation activities completed between Fall 1993 and Spring 1996; they examine student academic achievement and attitude, school climate and discipline, teacher innovation, and parental involvement.

1. Did the program at Site D meet its class size goals?

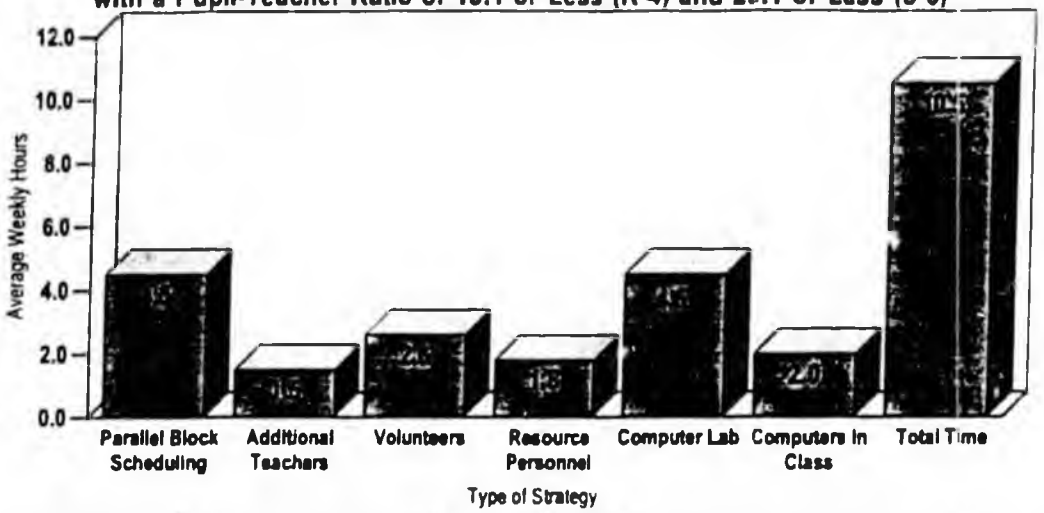
Goal 1: Reducing class sizes in reading and mathematics, focusing on the primary-grades

> *The primary-grades get the extra teachers, the librarian, and the music teacher; we are hoping we can keep this setup next year.* (First-grade Teacher)

All project participants agreed this goal was met. The attention to small-group time at the primary level, often with groups of 6:1 or less with the help of parent volunteers and special service and support personnel, was evident during every site visit made by the evaluator during 1995-96. Primary teachers agreed that the small-group time allowed them to attend to individual students on a very personal level as well as to engage the students in project-oriented activities requiring a significant degree of sophistication. With small groups the coordination of supplies for various activities can more easily be accommodated, and productive use of class time with frequent and substantive student-teacher interactions increased.

Data collected from the teachers' daily records show that in 1995-96 teachers had an average of 10.5 hours per week of substantive interaction time with a pupil-teacher ratio (PTR) of 15:1 or less for grades 1 through 4 and 20:1 or less for grades 5 and 6. In addition to computer labs and parallel block time, additional teachers, computers in class, and volunteers helped the classroom teachers further reduce the PTR to accommodate groups of 6:1 or less (see Figure 13). For the 1993-94 school year, the weekly time with reduced class size was 9.5 hours; for the 1994-95 school year, 13.3 hours. The drop in 1995-96 time occurred because the intermediate-grade teachers kept their whole classes for one day a week.

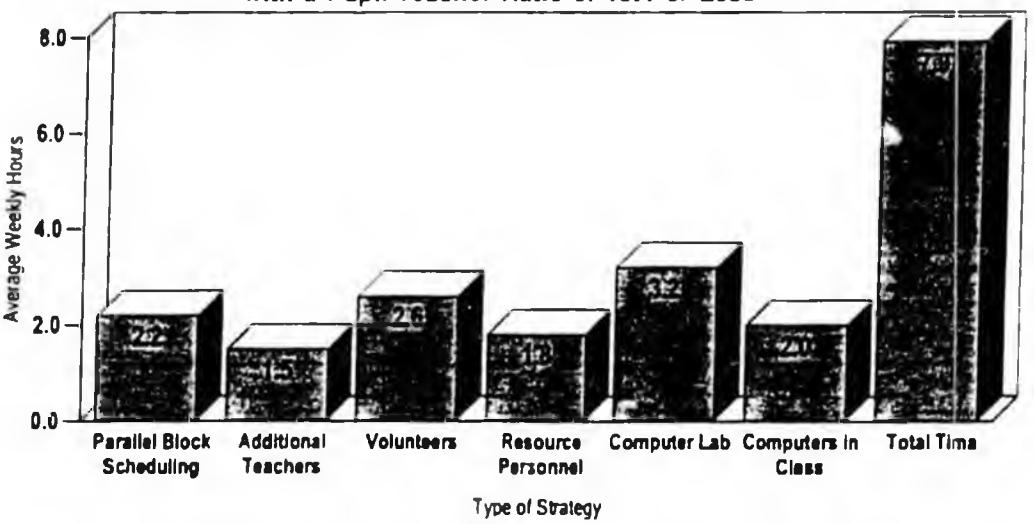
Figure 13. Site D Average Teacher Weekly Instruction Time with a Pupil-Teacher Ratio of 15:1 or Less (K-4) and 20:1 or Less (5-6)



Note: There are times when multiple strategies are taking place. As a result, the sum of the strategies is greater than the total time shown with reduced PTR.

The teachers' daily records allow us to make an estimate of time the average student spent in smaller classes. As Figure 14 shows, for an average student this translates into approximately 7.9 hours per week of available small-group instruction time.

Figure 14. Site D Average Student Instruction Time with a Pupil-Teacher Ratio of 15:1 or Less



Note: There are times when multiple strategies are taking place. As a result, the sum of the strategies is greater than the total time shown with reduced PTR.

Kindergarten

At the kindergarten level the overlapping extended day allowed one kindergarten class to have two hours of reduced class size time. This schedule, developed by the teachers and supported by the kindergarten parents, had been implemented at the school before the grant. These classroom teachers developed this no-cost approach to reducing class size and benefited from project-related activities including the computer lab, computer in the classroom, staff development, and parent volunteer training.

Under this arrangement in 1995-96, the first half of the class attended school from 8:50 a.m. to 1:20 p.m., and the second half attended from 10:50 a.m. to 3:20 p.m. Each child attended school for 4.5 hours—but for 2 of those hours, only approximately 12 students were in each group. The overlapping time block of 1.5 hours when all students were present included large-group special activities such as physical education, music, library, and computers as well as lunch and recess. Table 49 shows a sample of the daily kindergarten schedule.

Table 49. Site D Kindergarten Schedule

24 students 8:50 - 10:50	24 students 10:50 - 1:20	12 students - 1:20-3:20
Language Arts, Science, Social Studies, Art, Math	Story time, Special (music, P.E.), Lunch/recess, Computer, Centers	Language Arts, Science, Social Studies, Art, Math

Table 50 shows a sample of a multi-grade (kindergarten and first grade) schedule in 1995-96. First-grade students attended for the entire day—6.5 hours—and kindergarten students attended for 4.5 hours. This class configuration, set up at the beginning of the year, accommodated the grade-level mix of new students and increased the opportunity for Site D to implement the multi-grade approach to learning. Other split classes at this site included a first/second grade and second/third grade combination.

Table 50. Kindergarten and First Multi-grade Class Schedule

(A.M.)

8:50 - 10:20	10:20 - 10:50	10:50- 11:20	11:20- 11:50	11:50-12:20	12:20-12:50
Kdg & 1st	Kdg	Kdg & 1st	Kdg & 1st	Kdg & 1st	Kdg & 1st
Science	1st -specials	whole group	lunch	1st-grade-recess Kdg -computer lab	Special services 1st-grade -L. A. Kdg-math

(P.M.)

12:50-1:20	1:20	1:20-1:50	1:50-2:10	2:15-2:45	2:45-3:15
1st- math		1st	1st	1st	1st
Kdg- specials	Kdg dismissal	reading	recess	reading w/ extra teacher	computer lab **3:20 dismissal**

Goal 2: Improving students' ITBS scores in reading, language arts, and mathematics

(Refer to Research Question 5).

Goal 3: Increasing the use of nonstandard testing (including observations and other measures) in reading, writing, and mathematics

There are more opportunities to do in-depth assessment when the groups are smaller. I do more math assessment using story problems to observe students' critical thinking skills. I couldn't do this with a whole class. I need to see what strategies the child uses. If they're right I reinforce them and if they are wrong I correct them and move on. **(First-grade teacher)**

Examples of nonstandard testing and authentic assessments include observations, teacher-prepared performance tests, and student portfolios. While authentic assessments are not new to Site D, teachers consistently report on the increased opportunity to conduct in-depth, authentic assessments as a result of the *Elementary School Class Size Reduction Pilot Project.* Sharing perspectives on student performance and planning lessons according to the students' needs have been major benefits of the

increased collaboration between special service personnel, volunteers, and grade-level teachers. This shared perspective allows for more insightful and in-depth assessment of students performance.

Teachers report the need to understand the thought process, particularly of the primary students, in order to see what strategies they are using. To accomplish this requires uninterrupted, focused time with a single child or in very small groups (3-4) of children. Teachers at the intermediate level also need these very small groups for assessment. As a result of reduced PTR, teachers were able to increase the use of analytical writing assessments, drama, and math projects along with the ongoing strategy of observing and monitoring students' understanding of tasks.

Goal 4: Improving students' attitudes toward reading, writing, and mathematics

My class has 3 students with a tradition of spending a lot of time in the principal's office. They are not reformed, but they have had a wonderful year. They have some trouble with transition time, but in class they are challenged, working hard, and on-task. They certainly do better during periods of reduced PTR time. They need and like the recognition they get in small groups. **(Fourth-grade teacher)**

In small groups the students are more confident, especially the quiet students. I see student attitude toward learning change and also I see parent expectations change. They expect their children to be successful in school. **(Third-grade teacher)**

Student Survey Results

All students attending kindergarten through sixth-grades at Site D completed a survey on their perception of school and learning at the end of the 1993-94, 1994-95, and 1995-96 school years. The survey asked for information on attitudes toward learning and school. While student mobility rates (moving in and out of the school) restrict comparisons, survey results showed students in participating classes having positive and favorable attitudes toward school during all years of the project.

Asked if they like school, 51 percent of the students in 1995-96 responded "always" and 43 percent "sometimes." The responses about whether they liked reading and math were positive. Ninety-six percent of the students reported feeling school is a safe place, and only 3 percent reported not feeling good about how they were doing at school. Overall, as in the 1993-94 and 1994-95 survey results, students reported favorable attitudes toward learning, school, and safety (see Table 51).

Students were also asked to describe their favorite school activity. Of all students responding, 33 percent said physical education and sports were favorites; 15 percent; music, drama, and dance; and 9 percent, computer lab. Other favorite activities in order of preference included arts and crafts, mathematics, reading, and social/Alaska studies.

Table 51. Site D Students' Perceptions About School

	Always	Sometimes	Never	Don't Know	No Answer
Do you like school?	51%	43%	6%	0%	0%
Do you like reading at your school?	55%	40%	5%	0%	0%
Do you like doing math at your school?	53%	41%	6%	0%	0%
Do you feel your school is a safe place?	72%	24%	4%	0%	0%
Do you feel good about how you are doing at school?	62%	34%	3%	0%	1%
Do most of the kids in your class follow the rules?	28%	68%	3%	0%	1%
Number of students responding = 292					

Teachers reported the increased use of technology across the curriculum as having a positive influence on students' attitude toward learning. They reported it as one area where few instructions are necessary and students are always eager to work on projects through to completion. The opportunity to individualize the instruction, along with the mastery over the network system, excites the students. Writing in particular showed a dramatic improvement with the use of computers, according to the teachers. The increased frequency of writing and the ease of revising and editing all improved the students' writing skills.

Goal 5: Improving the attendance of students with poor attendance

> *We stress to the parents that we do have our small group time and getting to school on time is important. For the child whose attendance is a problem, the principal calls the parent or guardians to inquire about the child and to remind them of the importance of consistent attendance.* **(First-grade teacher)**

Attendance as an indicator of project impact has been a problem for all schools involved in the *Elementary School Class Size Reduction Pilot Project.* Since attendance is the responsibility of the parents more than the students, assessment of project impact on this area is questionable. Teachers reported illness and the tendency of families in this community to vacation in winter as significantly influencing the reported average absence rate of 9 students per week, per class. For students with chronic attendance problems, the principal contacts the home to discuss the situation and to remind parents of the importance of their children's regular attendance.

Goal 6: Improving the behavior of students with behavior problems

> *Behavior has improved immensely. I think the students have the opportunity and the tools, particularly with technology, to apply themselves to their area of interest. The loss of privileges, especially computer time, is really important and one they don't risk losing.* **(QUEST/technology specialist)**

> *The changes have definitely improved behavior. Small groups make it easier to keep the children involved and distractions a minimum. The chances for success are greater when the teacher can have groups of 2 or 3 rather than 26, with 13 students engaged and 13 distracted, confused, and unfocused.* **(First-grade teacher)**

In this study the following definitions are used to describe classroom climate, behavior, and academic achievement from the teacher's perspective. *Classroom climate* means the general physical and interpersonal atmosphere in the classroom and takes into account the students' behavior and involvement in the assigned learning tasks. *Class behavior* means any student response to a stimulus—whether an internal thought or impulse or an external intrusion. *Academic achievement* means weekly assessment of students' academic performance, using measures other than standardized tests.

Teachers rated class climate as excellent 69 percent of the time in 1995-95 and class behavior as excellent 53 percent of the time during periods of reduced class size. Academic achievement as a result of reduced PTR was reported as excellent 77 percent of the time and good 23 percent of the time. Ninety-five percent of the classroom teachers reported being very satisfied with reduced PTR (see Table 52). These figures remained relatively consistent throughout the three years of the grant, with teacher satisfaction reported higher during the final year.

Table 52. Site D Teacher Rating of Class Climate and Class Behavior During Whole-Class and Reduced PTR time, Overall Rating of Academic Achievement as a Result of Lower PTR, and Teacher Satisfaction with Lower PTR

Weekly Class Description	Poor	Fair	Good	Excellent
Class climate with reduced PTR	0%	0%	31%	69%
Class climate whole class	0%	16%	64%	20%
Class behavior with reduced PTR	0%	1%	46%	53%
Class behavior whole class	1%	27%	59%	13%
Academic achievement as a result of reduced PTR	0%	0%	23%	77%
Teacher satisfaction with Reduced PTR	Very Satisfied 95%	Somewhat Satisfied 5%		Not Satisfied 0%

Teachers and administrators admit that small classes are no panacea for troubled and disruptive students. However, behavior is substantially improved in class, and the quality of student-teacher interaction time is enhanced. All teachers agreed that keeping students on-task (uninterrupted time spent on productive learning activities) and engaged in learning, with sufficient attention to meet their individual needs, goes a long way toward improving behavior. Statements made by parents, observations of the evaluator, and behavior records kept by the principal all support these findings. The reports on behavior are exclusively for in-class behavior and do not represent students' behavior during recess, lunch, or on the bus before or after school.

The kids like the attention, even in the sixth-grade. One child came in new to the school very frustrated and withdrawn. While he still has trouble with academics, he participates and works hard. **(Sixth-grade teacher)**

Goal 7: Increasing the use of technology to enhance programs and provide enrichment opportunity

Computers are like a pencil to these students: another tool for learning **(First-grade teacher)**

Teachers unanimously agreed in 1995-96 that technology had been integrated into the overall curriculum and provided abundant enrichment opportunities. As Site D ended its third year of immersion in technology, the skill and comfort level with computer use among the students and teachers were dramatically higher than in the 1993-94 school year. Several teachers had no prior experience with computers and, lacking familiarity, initially resisted using them for instruction. As the project progressed and staff development opportunities were made available, attitudes toward computers changed. Also, a weekly computer night, staffed voluntarily by a teacher and aide, provided parents the opportunity to familiarize themselves with the existing technology. Students, with their unreserved approach to technology, became pragmatic resources for staff as well as for newly enrolled students.

The following statements are samples of classroom teachers' descriptions of their increased use of technology:

- My class has done electronic portfolios, HyperStudio, state research projects, and each made a tri-fold brochure for their state on HyperStudio. We have been integrating technology with every area of the curriculum using the lab and computers in the classroom. If there has been a positive change in the students' attitude toward school, it's been due to the use of technology. When we talk about a project, the kids can't wait to be left alone to get going on it. **(Fourth-grade teacher)**
- It is an understatement to say "yes." I was originally shy of the undertaking, but now I am so excited about it all. We can work on the programs and I am on the road to accomplishing so many things. The grant and technology helps me get over the feeling that I didn't have to know it all before we got started. **(Sixth-grade teacher)**

- Opportunities for use in kindergarten are so varied; we use it more here than in other grades. I have 6 computers in my room, and I use them for language and math enrichment and reinforcement. Just knowing how to operate the computers gives the students tremendous confidence. At this age kids are either hesitant to use the computer or they are just going to hit at the keyboard and assume things will come out right. Here they learn specific features of the computer and how to log on, select fonts, and pull up their own disks. At this time of the year, spring, they may ask to go to the bathroom during computer time but not for help with the computer. **(Kindergarten teacher)**
- With the help of parent volunteers, the students are publishing the stories they write. They usually begin a story outline in the lab, and back in the classroom they begin the writing. These kids know how to navigate the technology; they have the language to figure it out and feel very comfortable with it all. For the kids coming in new to the school, I see a big difference in their approach to computers, but they catch up so fast when they help each other. The computer definitely augments the range of learning style in the classroom. **(First-grade teacher)**
- We have had invaluable technology training. Without our training the kids couldn't do half of what they do. While some kids know far more than I know, the learning has a chain reaction, and the teacher is a critical part of it all. Here, the kids love the alpha smarts; they use them for notes, chapter reviews, and typing their own essays. It is just overwhelming. **(Third-grade teacher)**
- The classroom teacher has a very difficult time matching the needs of a broad range of students. With technology, the students who are advancing fast have the opportunity to extend themselves and go on. The students who are struggling to meet the criteria within the regular classroom, with inclusion as a model, have the opportunity to use the computer as a tool, especially when their fine motor ability is so poor. They can type their papers, and they look just as good as anybody else's. In math, with mastery development, math fast track, and drill and practice, basic memorization of math facts have to be in place. The computer is a patient teacher who goes over and over these facts with the child, providing instant feedback and enough entertainment so they don't get bored. **(QUEST/technology specialist)**

Goal 8: Training teachers in strategies for improving instruction

Staff Development

Staff development was an integral part of Site D's strategy for improving student achievement, attitude, and behavior and for increasing parental involvement and participation in their children's education. A comprehensive training component was in place for parents and teachers to increase and improve their understanding and implementation of changing educational practices.

The following is a sample of training sessions staff members at Site D participated in since the 1993-94 school year.

Introductory Training

- Total quality management
- Grant requirements
- Successful team building
- Technology (ClarisWorks)
- Technology (curriculum for computer labs)
- Language arts software, network programs, and CD-ROMS
- Language arts thematic and interdisciplinary integrated instruction
- Technology and mastery math
- Technology authentic assessment in language arts
- Language arts curriculum and software review
- Small group strategies
- Language arts literature circles and technology (CD-ROM)
- Technology (UACN, E-Mail, Internet)

District In-Service

- Technology: Preparing Young Americans for the 21st Century
- School Goals: Assessment techniques, collaboration, and technology
- Development of portfolio standards throughout the school
- Development of grade-level standards for word processing
- Electronic portfolio assessment

Teachers' In-Service training

- Language arts curriculum design
- Cooperative learning
- Reading, writing, and math integration
- Alaska reading conference
- Integrating technology into the curriculum
- Reading recovery
- Apple computers of tomorrow
- Technology integration
- Cooperative learning follow-up
- MECC software demonstration
- Peakview Elementary School in Colorado: an Education and Technology Model School
- Young children and literacy
- Early childhood education and motor development
- Technology planning
- Lego Dacto Technology workshop
- Visit to Idaho technology schools
- Electronic portfolio training
- Technology and Learning Conference in Atlanta
- Alaska State Math and Science Conference

Principal's In-service Training

- Total quality management
- Manager's role as coach
- New schools of thought
- Rigorous and relevant curriculum
- Introductory and on-going training for Hyper Studio
- Alpha Smart training
- Technology tips provided by staff (on-going)
- Training on use of spreadsheets
- *Skills for Excellence* in- service
- Several teachers attended Alaska State Technology Conference. The principal and "technology specialist" presented: *One Solution—Three-Year Technology Plan*
- Visual Math training for 4th through 6th-grade teachers
- All-day grant training with K-3 teachers
- Nancy Norman on math assessment
- Mary Laycock on math manipulatives for use in the classroom
- Intervention skills for at-risk students

Other District training opportunities

- NWREL Partnerships in Learning conference in Seattle
- NWREL Alternative Assessment workshop in Portland.

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he special education tutors, including special service teachers and Chapter One aides, assisted the ɔecial needs children either in the classroom or in "pull out" situations, where they were removed om the classroom and taught in small groups with other special needs students. This extended use of :source personnel helped the classroom teachers reduce the PTR and assist special needs children in assrooms with their peers. The tutors were accountable to the regular classroom teacher and became volved in team teaching by working with regular as well as special education students. While they ere able to assist with small-group instruction in the classroom, their main focus was attending to the udents qualifying for the special services.

nology

efer to Question 1, Goal 7)

ɪw did the class size reduction and the instructional innovation affect measured language arts d mathematics achievement?

ɔarative Data on Student Achievement

e of the principal goals of the *Elementary School Class Size Reduction Pilot Project* was to improve dent learning in math and language arts. Since students presumably learn in virtually any school gram, the relevant question is whether the rate of student learning under each school's project was her than it would have been had the project changes not been made.

cannot know how much students in the *Elementary School Class Size Reduction Pilot Project* ıld have learned had they not been in a project classroom. Our best sources of comparison are lents in other classrooms or other schools. Yet these students may benefit from other, unmeasured ructional innovations. Other students may also differ from project students in ways that cause them :arn at different rates, or they may begin their formal schooling at different levels of knowledge. ıatever comparison groups we use, then, will be imperfect. We think the best comparison group to ıs that composed of other students in the United States. We wanted to see if students in the *nentary School Class Size Reduction Pilot Project* improved their level of academic achievement · time, relative to other students in the United States.

ompare the academic achievement of project students with U.S. students, we used tests of ɛvement that are applied nationally for students in second through sixth grades and individually inistered norm-referenced and diagnostic tests for students in kindergarten and first grade. The : tests used to determine academic achievement are:

:owa Tests of Basic Skills ITBS)	These multiple choice tests are the most widely used measures of academic achievement in math and language arts. It is possible to compare individual student scores with the distribution of scores nationally.
ʼeabody Picture /ocabulary Test (PPVT)	These individually administered norm-referenced tests are are designed primarily to measure a subject's receptive (hearing) vocabulary for Standard American English. The test provides an estimate of a student's verbal ability, and in this sense it is an achievement test since it shows the extent of English vocabulary acquisition.

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KeyMath — These are individually administered diagnostic inventories of essential mathematics designed to provide a comprehensive assessment of a student's understanding of basic concepts and application of mathematics. Basic concepts assesses the foundation of knowledge upon which all of elementary mathematics is based. Applications assesses the use of knowledge and computational skills.

The Iowa Tests of Basic Skills is a measure of student achievement. The major advantage of the Iowa Test of Basic Skills is that it is the most widely used measure of academic achievement in language arts and mathematics. With these multiple choice tests, it is possible to compare individual student's scores with the distribution of scores nationally.

The Peabody Picture Vocabulary Test (PPVT) and KeyMath assessments were selected by consensus of the project coordinators, the project evaluator, and the Department of Education. Both tests are regarded as appropriate for providing a general overview of primary students' academic achievement in language and mathematics.

To provide a baseline measure of student achievement, we worked with the school district to arrange for project students in grades 2-6 to take the Iowa Test of Basic Skills (Form K) in October 1993 and another version of the test in April 1994 and 1995 and Winter 1996. The producers of the test, Riverside Publishing, scored the results and provided data tapes for analysis. Students in kindergarten and first grades at Site D were given individually administered norm-referenced and diagnostic tests in the Fall of 1994 and Spring of 1995 and 1996. Classroom teachers administered and scored the tests and ISER performed the analysis of these test results.

The State of Alaska reports statewide and district testing results in terms of national percentile ranks. We used national percentile ranks and grade equivalent to measure the ITBS and KeyMath results of project students relative to all U.S. students. We used percentile rank as a measure of academic achievement for students taking the PPVT. We tracked the math and language arts achievement of individual students in each project school. An analysis of academic growth as measured by these tests for all students and for at-risk students, where numbers of students are sufficient, are analyzed separately. At-risk students are identified as having increased probability for school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), or English as a Second Language. A description of these methods of reporting test results follows.

National Percentile Rank — Indicating the percentage of students taking the test nationally who scored lower on the test than the individual student.

Grade Equivalent — Indicating the year and month of schooling of students nationally that corresponds with the student's test performance. By comparing the student's actual grade level (e.g. 4.2 years) with the grade equivalent (e.g. 4.6 years) it is possible to tell if the student is learning at a faster, or slower, or similar rate as students in the U.S. as a whole.

Test results should be interpreted with caution. The period of time between administration of pre- and post-tests for the KeyMath and PPVT was 18 months and for the ITBS 28 months—relatively short periods on which to base conclusions about the impact of the project.

All students in kindergarten through sixth grade at Site D participated in *the Elementary School Class Size Reduction Pilot Project.* Students in kindergarten and first grade were tested using PPVT and KeyMath assessments in Fall 1994, Spring 1995. These same cohorts were given the ITBS in the

Table 60 shows an increase in grade equivalent of eight months on basic concepts and six months on applications for at-risk students.

Table 60. Site D KeyMath Grade Equivalent At-Risk Students

KeyMath		GRADE EQUIVALENT	
		Basic Concepts	Applications
School	No. Students Tested	Mean Change	Mean Change
Site D	31	.8	.6

Table 61 shows the national percentile rank of PPVT test results for kindergarten and first grade students. Results show the percentile rank increased for both grades.

Table 61. Site D PPVT Percentile Rank All Students

PPVT			PERCENTILE RANK	
School	Grade Cohort	No. Students Tested	Fall 94	Spring 95
Site D	K	47	48	55
	1	52	53	59

At-risk students in kindergarten and first grade demonstrated an increase in national percentile rank. (See Table 62.)

Table 62. Site D PPVT Percentile Rank At-Risk Students

PPVT			PERCENTILE RANK	
School	Grade Cohort	No. Students Tested	Fall 94	Spring 95
Site D	K	25	28	39
	1	17	28	43

On average, national percentile rank for the second, third and fourth grade cohorts increased in all areas from Fall 1993 to Winter 1996. The fourth grade cohort increased 20 points in math, 25 points in reading and 28 points in language arts. (See Table 63.)

Table 63. Site D ITBS National Percentile All Students

ITBS			NATIONAL PERCENTILES								
			Math			Reading			Language Arts		
School	Grade Cohort	No. Students Tested	Fall '93	Spring '95	Winter '96	Fall '93	Spring '95	Winter '96	Fall '93	Spring '95	Winter '95
Site D	2	32	71		76	54		67	58		63
	3	34	56		67	55		73	47		66
	4	38	65		85	51		76	44		72
	5	32	53	70		52	62		47	65	

Table 64 shows the national percentile rank of at-risk students for all students at Site D. On average, the national percentile rank from Fall 1993 to Winter 1996 increased 21 points in math and language arts and 12 points in reading.

Table 64. Site D ITBS National Percentile At-Risk Students

ITBS		NATIONAL PERCENTILES					
		Math		Reading		Language Arts	
School	No. Students Tested	Fall 93	Winter 96	Fall 93	Winter 96	Fall 93	Winter 96
Site D	24	39	60	29	41	29	50

Students at Site D demonstrated an increase in math grade equivalent. The mean change from Fall 1993 to Winter 1996 for the second grade cohort, was three years, six months; the third grade cohort, three years, two months; and the fourth grade cohort, three years, one month. (See Table 65.)

Table 65. Site D ITBS Grade Equivalent Mean Change All Students Math

School	Grade Cohort	No. Students Tested	Fall '93	Spring '95	Winter '96	Mean Change Fall 93-Spring 95	Mean Change Fall 93-Winter 96
Site D	2	32	2.7		5.9		3.6
	3	34	3.5		6.6		3.2
	4	38	4.9		9.6		3.1
	5	32	5.6	8.7		3.1	

Students at Site D demonstrated an increase in reading grade equivalent. The mean change from Fall 1993 to Winter 1996 for the second grade cohort was two years, nine months; the third grade cohort, three years, four months; and the fourth grade cohort, three years, nine months. (See Table 66.)

Table 66. Site D ITBS Grade Equivalent Mean Change All Students Reading

School	Grade Cohort	No. Students Tested	Fall '93	Spring '95	Winter '96	Mean Change Fall 93-Spring 95	Mean Change Fall 93-Winter 96
Site D	2	32	2.7		5.5		2.9
	3	34	3.6		7.0		3.4
	4	38	4.4		8.5		3.1
	5	32	5.6	7.6		2.0	

Students at Site D demonstrated an increase in language arts grade equivalent. The mean change from Fall 1993 to Winter 1996 for the second grade cohort, was two years, nine months; third grade cohort, three years, six months; and the fourth grade cohort, four years, seven months. (See Table 67.)

Table 67. Site D ITBS Grade Equivalent Mean Change All Students Language Arts

School	Grade Cohort	No. Students Tested	Fall '93	Spring '95	Winter '96	Mean Change Fall 93-Spring 95	Mean Change Fall 93-Winter 96
Site D	2	32	2.5		5.3		2.9
	3	34	3.4		7.0		3.6
	4	38	4.1		8.9		4.7
	5	32	5.4	8.5		3.1	

At-risk students at Site D showed an average increase in grade equivalent. The mean change from Fall 1993 to Winter 1996 in math was three years, one month; in reading, two years, four months; and in language arts, two years, nine months.

Table 68. Site D ITBS Grade Equivalent Mean Change At-Risk Students

ITBS School	No. Students Tested	GRADE EQUIVALENTS Math Mean Change Fall 93-Winter 96	Reading Mean Change Fall 93-Winter 96	Language Arts Mean Change Fall 93-Winter 96
Site D	24	3.1	2.4	2.9

6. How are parent involvement, teacher satisfaction, and student attendance affected by the class size reduction and associated innovations?

Parent Involvement: (Refer to Research Question 4)

Teacher Satisfaction and Student Attendance: (Refer to Research Question 1, Goals 5 and 6)

7. How can this project be replicated at other elementary sites?

The following statements are recommendations from parents, teachers, and support personnel to elementary schools considering implementing strategies that allow for periods of reduced pupil-teacher ratio without significantly adding to the cost of education:

- Technology works to individualize and improve instruction, but a school must make a long-term commitment supported by sufficient funds for equipment, training, and maintenance.
- Invest in quality technology training and invite parents to participate in the training.
- Let loose of traditional teaching practices. Encourage and support teacher interaction within the school, within the district, and at other schools working toward implementing innovative instructional practices.
- In order to let go of traditional teaching practices, teachers need to see new methods in action. They should visit schools, observe in classrooms, and talk to teachers about how they worked through their changes.
- Use specialists in the classroom at the primary level (resource personnel, music teacher, librarian etc.).
- Make a long-term commitment to change.
- Look closely at parallel block scheduling; this idea alone is terrific and the small-group time is invaluable.
- Implement varied grouping in the classroom environment.
- Use study buddies (older students working with younger students); this works great for both age groups.
- The role of the principal is critical. If the principal is not an instructional leader in authority and academics and well-respected, any change will be difficult.

- An estimated 75% of teacher training expenditures were used to startup the program. Once the program was established only 25% of these funds would be required. Therefore, teacher training was calculated at a 25% rate.
- Administration/clerical expenditures were used to perform grant administrative tasks and therefore were considered project and program costs.
- During the first two fiscal years specialized and/or interactive teaching aids were purchased. They were considered startup expenses. Therefore, the expenditures for supplies during the last fiscal year was used in calculating annual program supply costs.
- Capital equipment purchases (computer purchases) were assumed to have a use-life of eight years.

SUMMARY

Site D successfully implemented all of its proposed strategies and met all of its goals under the *Elementary School Class Size Reduction Pilot Project*. End-of-the-year evaluations and interviews with parents, teachers, and students reported increased academic achievement, improved attitude and behavior, teacher innovation, and parent involvement. The most significant features at Site D were parallel block scheduling and increased technology. Teacher innovation followed in importance as the periods of reduced class size and staff development provided the critical supports to successfully implement changes in teaching and learning.

The extensive involvement of staff and parents at every stage of the grant, starting from the development of a vision for the school improvement plan to the numerous committees set up to deal with conflicts and controversies, assured a shared ownership and responsibility for project outcomes. Teachers credit the instructional leadership from the principal and the increase in professional interactions with staff as significant contributors to overall satisfaction with the project.

Some concerns reported throughout the three years of the grant included increased length of the school day for teachers, increased amount of planning time and general paperwork, a lack of flexibility in daily class schedules, and the community perception of disproportionate funding among district schools. These concerns were secondary in comparison to the benefits teachers and parents observed over the three years of the grant, including increased computer literacy for parents, teachers, and students; occasions to debate and review educational practices; decrease in discipline problems in the classroom; improved creativity and collaboration; and opportunities to get to know parents and students on a more personal level.

Communication and documentation of the grant implementation at Site D have been extensive, with all teachers reporting "thinking logs" to the principal. These logs described the impact and outcomes of changes in their classrooms. The reports, summarized and distributed weekly among all faculty and staff, served to bond the participants, encourage self-evaluation, and improve the grant to better meet individual and group needs.

The staff at Site D successfully met their initial class size goals. They are proud of their accomplishments and, with the support of the community and parents, are working to make the transition to pre-grant funding and redistribute existing resources to maintain some of the more critical and cost-effective approaches to improving instruction.

SB

208

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Senator Gary Stevens
Alaska State Legislature

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Memo

To: Senator Fred Dyson, Senate HESS Committee

From: Senator Gary Stevens

Date: 1/23/2006

Re: Committee hearing request

I would like to request a HESS Committee hearing on Senate Bill 208, "An Act requiring hospitals to collect data and disclose reports of hospital-acquired infections" at your earliest convenience.

Thank you for your consideration of this request.

Senate District R
Senator_Gary_Stevens@legis.state.ak.us

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Sponsor Statement for SB 208

SB 208 "An Act requiring hospitals to collect data and disclose reports of hospital-acquired infections" is a consumer protection measure for health care patients.

Shockingly, some 2 million infections a year are acquired in hospitals and an estimated 90,000 people die as a result of these infections, making it the sixth-leading cause of death in the country. The cost to the consumers is also enormous between $4.5 and $11 billion a year. Given these alarming statistics, it is vital for consumers to have full knowledge of how medical facilities fare with infection rates. SB 208 helps accomplish this goal by requiring hospitals to collect data about hospital-acquired infection rates for surgical site infections, ventilator-associated pneumonia, central line-related bloodstream infections, urinary tract infections and other categories of infections as adopted by the Depa ment of Health and Social Services by regulation. This information would be prepared for quarterly disclosure reports for the public in a way that does not disclose confidential patient information nor identify persons involved in an incident of infection.

This bill is not meant to threaten or cast doubt on Alaska's health care facilities. It will, however, help consumers make informed choices and compel facilities to try harder to prevent healthcare associated infections.

I ask for your support of SB 208.

Senate District R
Senator_Gary_Stevens@legis.state.ak.us

LEGAL SERVICES

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MEMORANDUM January 10, 2006

SUBJECT: Hospital Acquired Infection Reporting (SB 208)
(Work Order No. 24-LS1213\A)

TO: Senator Gary Stevens
Attn: Doug Letch

FROM: Jean M. Mischel
Legislative Counsel

You have requested a sectional summary of the above-described bill.

As a preliminary matter, note that a sectional summary of a bill should not be considered an authoritative interpretation of the bill and the bill itself is the best statement of its contents. If you would like an interpretation of the bill as it may apply to a particular set of circumstances, please advise.

Section 1. Requires hospitals to collect data and prepare and disclose reports on hospital acquired infection rates.

Section 2. Authorizes the Department of Health and Social Services to adopt regulations consistent with section 1 of the bill.

Section 3. Provides an effective date for section 1 of July 1, 2007.

JMM:ljw
06-008.ljw

Web posted Monday, January 16, 2006

Bill would require hospitals to release infection statistics to public

By HAL SPENCE
Peninsula Clarion

Alaska hospitals would be required to release information about cases of infection acquired by patients during hospital stays under a bill proposed by Senate Majority Leader Gary Stevens.

Majority Leader Gary Stevens

"A good friend of mine was in the hospital last year for a simple operation and wound up with an infection that put him close to death," the Republican from Kodiak said in an interview Tuesday. "I started looking into the facts."

Stevens said he learned that some 2 million infections a year are acquired in hospitals and that an estimated 90,000 people die annually as a result.

"It's the sixth-leading cause of death in the country," he said. "That's shocking to realize, but it is something that is correctable."

Nationally, it is estimated that hospital-acquired infections, called nosocomial infections, cost consumers $4.5 billion to $11 billion a year. At least a third are considered preventable, according to the Center for Disease Control and Prevention.

Reducing the rates of in-hospital infections would take greater vigilance by hospitals and by their often-overworked doctors and staff, Stevens said.

Search

This week's stories

Miss a day?
Use the list to see the stories from the past week.

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- Wednesday
- Tuesday
- Monday

Today's front page


CLARION
Hospitals -- bad for health?
Threat level lowers

"It may often be as simple as washing hands between patients" or "making sure patients are getting the right antibiotics before incisions," he said.

David Gilbreath, CEO Central Peninsula General Hospital

Senate Bill 208 would require hospitals to collect data about hospital-acquired infection rates for surgical site infections, ventilator-associated pneumonia, central line-related bloodstream infections, urinary tract infections and other categories of infections as adopted by the Department of Health and Social Services by regulation. (See sidebar, this page) If passed, SB 208's provisions would go into effect July 1, 2007.

His motivation, Stevens said, was a belief that the medical services-buying public has a right to know a facility's in-hospital infection rate.

"Consumers should have full knowledge about what places to try to avoid," he said.

He also said introduction of the bill was not meant to cast aspersions or threaten Alaska hospitals.

"It is nothing about hospitals in the areas I represent," he said, adding that he'd spoken with representatives of one facility who agreed public disclosure of inf ction rates was a good idea.

The bill would require hospitals to collect infection data and prepare quarterly disclosure reports for the public. Those reports would be written in a way that would not disclose confidential patient information nor identify persons involved in an incident of infection. Quarterly reports would have to be posted at the hospital and available on request.

David Gilbreath, director of Central Peninsula General Hospital, said he as always been supportive of releasing such information to the public.

"The data is available and not at all a headache to report," he said.

CPGH has joined the 100,000 Lives Campaign sponsored by the Institute for Healthcare Improvement that is promoting specific measures to cut hospital deaths nationwide, including those caused by nosocomial infections. Some 3,000 hospitals have joined the effort. Dr. Todd Boling, a general surgeon and chief of the medical staff, who assumed his position in July 2005, is heading the campaign at CPGH, Gilbreath said.

"We don't know what the impact is going to be, but we have

team members, including physicians, looking at the campaign components (the types of infections). We have made adjustments and our infection rate is extremely low," Gilbreath said.

Ken Simmons, CPGH's infection control officer, said that in 2002, the hospital recorded roughly 3.6 hospital-acquired infections per 1,000 patient days. That figure has fallen each year since, and while all the data is not yet in for 2005, it appears the hospital will achieve a rate of better than the 2.9 per 1,0000 patient days registered in 2004, Simmons said.

He noted that it would be important if the law passes that every hospital report the data the same way so consumers could accurately compare facilities.

South Peninsula Hospital Administrator Charlie Franz said he, too, would have no problem making such information available, saying he is trying to make the hospital's activities "as transparent as possible."

SPH has not, so far, joined the IHI campaign, Franz said, but the staff has begun to implement portions of the program and phasing into the campaign is under consideration.

ASSOCIATION FOR PROFESSIONALS IN
INFECTION CONTROL AND EPIDEMIOLOGY

APIC

December 8, 2005

The Honorable Norman Rokeberg
Alaska State House of Representatives
716 West 4th Avenue
Anchorage, AK 99501

Re: Mandatory reporting of healthcare associated infections (HAIs)

Dear Representative Rokeberg:

In February of this year, there was a conference titled "Healthcare-Associated Infections: Realizing the Benefits of Mandatory Public Reporting" that was sponsored by the Association for Professionals in Infection Control and Epidemiology (APIC), in partnership with the Centers for Disease Control and Prevention (CDC), Consumers Union (CU), National Quality Forum (NQF), and the Society for Healthcare Epidemiology of America (SHEA).

The premise of the conference was that consumers have a right to know certain statisticsabout healthcare facilities and that public reporting of infection rates, along with other quality indicators, will allow the public to make informed choices and will also compel facilities to strive harder to prevent healthcare-associated infections (HAI). Mandatory public reporting has been adopted as a campaign by the Consumer's Union (http://www.consumersunion.org/). Citizens are encouraged to contact their legislators to express concern and demand action. With the common goal of ensuring patient safety, healthcare organizations, such as APIC and SHEA, have become involved with guiding the process of mandatory reporting so as to achieve the intended outcomes, but guarantee that the systems generated are practical and meaningful. It is important to point out that all organizations, including the Consumers Union want to see hospital specific data, not physician specific data being reported. If a physician has a high infection rate that would be reflected in the hospital's rates and is the responsibility of that hospital to address.

Since the conference, the NQF has agreed to move forward in developing a comprehensive set of national consensus standards for the collection and public reporting of HAIs. Both SHEA and Infectious Disease Society of America (IDSA) Board of Directors have endorsed the recommendations of the CDC Healthcare-Infection Control Practices Advisory Committee (HICPAC) entitled "Guidance on Public Reporting of Healthcare-Associated Infections." The guidelines offer four main overarching recommendations regarding mandatory reporting of HAIs:

1) Use established public health surveillance methods when designing and implementing mandatory HAI reporting systems.

2) Create a multidisciplinary advisory panel to monitor the planning and oversight of the operations and products of HAI public reporting systems.

3) Choose appropriate process and outcome measures based on facility type and phase in measures gradually to allow time for facilities to adapt andto permit ongoing evaluation of data validity.

4) Provide regular and confidential feedback of performance data to health care providers.

Seven states have enacted legislation to require health care organizations to publicly report HAIs, with one state (Nevada) reporting only to state government. Four others are considering such legislation in 2005. Six states have study bills, while 21 states have failed legislation in 2005. The importance of HAIs and the need to prevent them cannot be questioned, however, the potential pitfalls of public reporting are numerous. For example, the selection of appropriate, risk adjusted outcomes, inclusion of process measures, development of standardized methods of data collection, and sensitivity towards the resources available to infection control departments to collect such data are critically important. If these potential pitfalls are not addressed in legislation, then the public reporting systems will mislead the public with inaccurate data.

Four states where reporting has been mandated presented their programs, but did not dwell on the legal authority for reporting or details of the particular reporting body. These states are Pennsylvania, Missouri, Illinois, and Florida. California passed a bill in 2004 but the California Hospital Association was very aggressive in opposing the bill as it was written and the Governor vetoed the bill. Several other states have legislation pending this session, with most states having deadlines to file their first reports by 2006. With the exception of Missouri, the requirement for reporting has been an unfunded mandate. For states without established legislation, the Consumers Union has drafted language that could be adopted (see http://www.consumersunion.org/pub/campaignstophospitalinfections/000879).

Among those who have passed legislation, there is wide variation in what is being reported and where reports are received. For example, Pennsylvania has a stand alone state agency that receives reports about HAIs in addition to other information, e.g., costs, etc. (see http://www.phc4.org/Default.htm). Pennsylvania was the first state to enact mandatory reporting that started in 2004 and is the example of *"how not to do it."*

Missouri appears to be the only state that received funding attached to the bill to manage the reports coming into their Department of Health, Section of Information Management. Florida's bill mandated reporting to their hospital licensing agency. Reports in Illinois must be made to the Department of Public Health, although the exact location was not specified. The IL Hospital Association is also very active in compiling and risk-adjusting data.

For Alaska, there seems to be several issues to address that might require a legal opinion. For example, which state agency has the statutory authority to compel hospitals to report rates or other indicators? If they go to Public Health, how would the current Epidemiology regulations need to be amended? Is staff from the Office of Health Facilities Licensing and Certification (HFLC) aware of the potential for a mandatory reporting bill? Is the Alaska State Hospital and Nursing Home Association (ASHNHA) aware of the potential for a mandatory reporting bill? Will there be consequences associated with reporting, e.g., the draft Consumers Union bill has associated penalties with noncompliance? Before drafting legislation, these questions should be addressed.

What do Alaskans want? Is it different from what is wanted in other states? The Consumers Union claims that consumers nationwide desire statewide reporting from hospitals. Before creating legislation to address this issue, it would be beneficial to understand what Alaskans want to know. If Alaskan consumers want to compare hospitals within the state to each other, then statewide hospital report cards will meet their need. However, if they are more interested in knowing how in-state facilities compare to out-of-state ones, then creating state-specific legislation might not meet their need. For that case, advocating for a system of nationally mandated reporting would better allow for state to state comparisons.

The issue of *nationally* mandating reporting was not addressed at the conference and it is unlikely a nationally mandated reporting system available to the public would be implemented in a timely fashion. The National Healthcare Safety Network (NHSN) is implementing a voluntary national reporting system that is scheduled to be up and running by this summer. Hospitals can choose to allow other agencies e.g., State Health Departments, viewing privileges of the data but a public viewing component on the level of individual hospitals is not planned for NHSN.

Who are the stakeholders in Alaska? Because the mandating of reporting has the potential to overwhelm healthcare and reporting agency resources, attention must be paid to issues such as the timeline and content of reports.

Based on the experiences of the states who have passed legislation, the formation of an Advisory Group to provide guidance and oversight to the process seems critical. Among the states with passed or pending legislation, the composition of these groups varies, but usually includes hospital epidemiologists, consumers, infection control professionals, state hospital association representatives, among others. The Group can steer the legislation to reflect consensus on reporting schedules, data formatting, consistency with national standards, etc. As for many legal processes, the wording of the actual bill may be broad, with the Advisory Group responsible for developing specific parameters to address the purpose of the bill.

As mentioned above, it is unclear if the Alaska HFLC or ASHNHA are aware of this issue. Especially relevant to Alaska is the position of small hospitals and stand alone surgery centers. Some reporting systems have exempted smaller hospitals with low patient censuses or who do a low number of specific surgical cases; would this address the Alaskan consumers' concerns? If smaller hospitals are exempted and since ANMC serves a very specific population there is the potential for it to become an issue of Alaska Regional's HAI rates compared to Providence Alaska's HAI rates. If that is the case, and what consumers want, should both facilities agree on what should be reported and report voluntarily without enacting legislation at this time?

Because there is great diversity in Alaska hospitals and healthcare facilities, it will be important to ensure that all stakeholders are engaged. For more information on infection surveillance, prevention, and control programs, please visit the APIC website at www.apic.org.

We hope this information is helpful as decisions are being made about mandatory reporting here in Alaska. If we can assist in any way, please do not hesitate to ask.

Sincerely,

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GUIDANCE ON PUBLIC REPORTING OF HEALTHCARE-ASSOCIATED INFECTIONS

Recommendations of the Healthcare Infection Control Practices Advisory Committee

Executive Summary

Healthcare-associated infections (HAIs) are a major public health problem in the United States. In hospitals alone, HAIs account for an estimated 2 million infections, 90,000 deaths, and $4.5 billion dollars in excess healthcare costs annually. Since 1970, a group of U.S. hospitals (now numbering nearly 300) has voluntarily reported to the Centers for Disease Control and Prevention (CDC), on a confidential basis, data on selected HAIs that occur in their hospitals.

Since 2002, four states have enacted legislation that requires healthcare organizations to publicly disclose HAI rates. Similar legislative efforts are underway in several other states. Advocates of mandatory public reporting of HAIs believe that making such information publicly available will enable consumers to make more informed choices about their healthcare and improve overall healthcare quality by reducing HAIs. Further, they believe that patients have a right to know this information. However, others have expressed concern that the reliability of public reporting systems may be compromised by institutional variability in the definitions used for HAIs, or in the methods and resources used to identify HAIs.

Presently, there is insufficient evidence on the merits and limitations of an HAI public reporting system. Therefore, the Healthcare Infection Control Practices Advisory Committee (HICPAC) has not recommended for or against mandatory public reporting of HAI rates. However, HICPAC has developed this guidance document based on established principles for public health and HAI reporting systems. This document is intended to assist policymakers, program planners, consumer advocacy organizations

and others tasked with designing and implementing public reporting systems for HAIs. The document provides a framework for legislators, but does not provide model legislation.

HICPAC recommends that persons who design and implement such systems 1) use established public health surveillance methods when designing and implementing mandatory HAI reporting systems; 2) create multidisciplinary advisory panels, including persons with expertise in the prevention and control of HAIs, to monitor the planning and oversight of HAI public reporting systems; 3) choose appropriate process and outcome measures based on facility type and phase in measures to allow time for facilities to adapt and to permit ongoing evaluation of data validity; and 4) provide regular and confidential feedback of performance data to healthcare providers.

Specifically, HICPAC recommends that states establishing public reporting systems for HAIs select one or more of the following process or outcome measures as appropriate for hospitals or long-term care facilities in their jurisdictions: 1) central-line insertion practices, 2) surgical antimicrobial prophylaxis; 3) influenza vaccination coverage among patients and healthcare personnel; 4) central line-associated bloodstream infections; and 5) surgical site infections following selected operations. HICPAC will update these recommendations as more research and experience become available.

Introduction

Consumer demand for healthcare information, including data about the performance of healthcare providers, has increased steadily over the past decade. Many state and national initiatives are underway to mandate or induce healthcare organizations to publicly disclose information regarding institutional and physician performance. Mandatory public reporting of healthcare performance is intended to enable stakeholders, including consumers, to make more informed choices on healthcare issues.

Public reporting of healthcare performance information has taken several forms. Healthcare performance reports (report cards and honor rolls) typically describe the outcomes of medical care in terms of mortality, selected complications, or medical errors and, to a lesser extent, economic outcomes. Increasingly, process measures (i.e., measurement of adherence to recommended healthcare practices, such as handwashing) are being used as an indicator of how well an organization adheres to established standards of practice with the implicit assumption that good processes lead to good healthcare outcomes. National healthcare quality improvement initiatives, notably those of the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO), the Centers for Medicare & Medicaid Services (CMS), and the Hospital Quality Alliance, use process measures in their public reporting initiatives.

Healthcare-associated infections (HAIs) are infections that patients acquire during the course of receiving treatment for other conditions (see Glossary for full definition of this and other terms used in this document). In hospitals alone, HAIs account for an estimated 2 million infections, 90,000 deaths, and $4.5 billion dollars in excess healthcare costs annually (1); however, few of the existing report cards on hospital performance use

HAIs as a quality indicator. Since 2002, four states (Illinois, Pennsylvania, Missouri, and Florida) have enacted legislation mandating hospitals and healthcare organizations to publicly disclose HAI rates. Similar legislative efforts are underway in several other states.

Because of the increasing legislative and regulatory interest in this area, the Healthcare Infection Control Practices Advisory Committee (HICPAC) conducted a scientific literature review to evaluate the merits and limitations of HAI reporting systems. We found no published information on the effectiveness of public reporting systems in reducing HAIs. Therefore, HICPAC has concluded that there is insufficient evidence at this time to recommend for or against public reporting of HAIs.

However, to assist those who will be tasked with designing and implementing such reporting systems, HICPAC presents the following framework for an HAI reporting system and recommendations for process and outcome measures to be included in the system. The framework and recommendations are based on established principles for public health and HAI surveillance. This document is intended primarily for policymakers, program planners, consumer advocacy organizations, and others who will be developing and maintaining public reporting systems for HAI. The document does not provide model legislation.

This document represents the consensus opinion of HICPAC. HICPAC is a federal advisory committee that was established in 1991 to provide advice and guidance to the Department of Health and Human Services and CDC regarding surveillance, prevention, and control of HAIs and related events in healthcare settings. These recommendations also have been endorsed by the Association for Professionals in

Infection Control and Epidemiology, the Council of State and Territorial Epidemiologists, and the Society for Healthcare Epidemiology of America. These recommendations will be updated as new information becomes available.

Essential Elements of a Public Reporting System for HAIs

As a first step, the goals, objectives, and priorities of a public reporting system should be clearly specified and the information to be monitored should be measurable to ensure that the system can be held accountable by stakeholders. The reporting system should collect and report healthcare data that are useful not only to the public, but also to the facility for its quality improvement efforts. This can be achieved by selection of appropriate measures and patient populations to monitor; use of standardized case-finding methods and data validity checks; adequate support for infrastructure, resources, and infection control professionals; adjustment for underlying infection risk; and production of useful and accessible reports for stakeholders, with feedback to healthcare providers. The planning and oversight of the system should be monitored by a multidisciplinary group composed of public health officials, consumers, healthcare providers, and healthcare infection control professionals.

Identifying Appropriate Measures of Healthcare Performance

Monitoring both process and outcome measures and assessing their correlation is a comprehensive approach to quality improvement. Standardized process and outcome measures for national healthcare performance for hospitals, nursing homes, and other settings have been endorsed through the National Quality Forum (NQF) voluntary consensus process (2-4). NQF also has developed a model policy on the endorsement of

proprietary performance measures (5). Several other agencies and organizations, including CDC, CMS, the Agency for Healthcare Quality and Research, JCAHO, the Leapfrog organization, and the National Committee for Quality Assurance, also have developed healthcare quality measures. Healthcare performance reports should identify the sources and endorsers of the measures and the sources of the data used (e.g., administrative or clinical).

Process measures are desirable for inclusion in a public reporting system because the target adherence rate of 100% to these practices is unambiguous. Furthermore, process measures do not require adjustment for the patient's underlying risk of infection. Process measures that are selected for inclusion in a public reporting system should be those that measure common practices, are valid for a variety of healthcare settings (e.g., small, rural vs. large, urban hospitals); and can be clearly specified (e.g., appropriate exclusion and inclusion criteria). Process measures meeting these criteria include adherence rates of central-line insertion practices and surgical antimicrobial prophylaxis and coverage rates of influenza vaccination for healthcare personnel and patients/residents (Table 1). Collection of data on one or more of these process measures already is recommended by the NQF and required by CMS and JCAHO for their purposes.

Outcome measures should be chosen for reporting based on the frequency, severity, and preventability of the outcomes and the likelihood that they can be detected and reported accurately (6). Outcome measures meeting these criteria include central line-associated, laboratory-confirmed primary bloodstream infections (CLA-LCBI) in intensive care units (ICU) and surgical site infections (SSIs) following selected

operations (Table 2). Although CLA-LCBIs and SSIs occur at relatively low rates, they are associated with substantial morbidity and mortality and excess healthcare costs. Also, there are well-established prevention strategies for CLA-LCBIs and SSIs (7,8). Therefore, highest priority should be given to monitoring these two HAIs and providers' adherence to the related processes of care (i.e., central-line insertion practices for CLA-LCBI and surgical antimicrobial prophylaxis for SSIs).

Use of other HAIs in public reporting systems may be more difficult. For example, catheter-associated urinary tract infections, though they may occur more frequently than CLA-LCBIs or SSIs, are associated with a lower morbidity and mortality; therefore, monitoring these infections likely has less prevention effectiveness relative to the burden of data collection and reporting. On the other hand, HAIs such as ventilator-associated pneumonia, which occur relatively infrequently but have substantial morbidity and mortality, are difficult to detect accurately. Including such HAIs in a reporting system may result in invalid comparisons of infection rates and be misleading to consumers.

Monitoring of process and outcome measures should be phased in gradually to allow time for facilities to adapt and to permit ongoing evaluation of data validity.

Identifying Patient Populations for Monitoring

CDC (9) and other authorities (10) no longer recommend collection or reporting of hospital-wide overall HAI rates because 1) HAI rates are low in many hospital locations (which makes routine inclusion of these units unhelpful), 2) collecting hospital-wide data is labor intensive and may divert resources from prevention activities, and 3) methods for hospital-wide risk adjustment have not been developed. Rather than

hospital-wide rates, reporting rates of specific HAI for specific hospital units or operation-specific rates of SSIs is recommended (9). This practice can help ensure that data collection is concentrated in populations where HAIs are more frequent and that rates are calculated that are more useful for targeting prevention and making comparisons among facilities or within facilities over time.

Case-Finding

Once the population at risk for HAIs has been identified, standardized methods for case-finding should be adopted. Such methods help to reduce surveillance bias (i.e., the finding of higher rates at institutions that do a more complete job of case-finding). Incentives to find cases of HAI may be helpful. Conversely, punitive measures for hospitals that report high rates may encourage underreporting.

Traditional case-finding methods for HAIs include review of medical records, laboratory reports, and antibiotic administration records. However, these standard case-finding methods can be enhanced. For example, substantially more SSIs are found when administrative data sources (e.g., *International Classification of Diseases, 9th Revision* [ICD-9], discharge codes) are used in combination with antimicrobial receipt to flag charts for careful review (11,12). However, the accuracy of case-finding using ICD-9 codes alone likely varies by HAI type and by hospital. Therefore, ICD-9 discharge codes should not be relied upon as the sole source for HAI monitoring systems.

Traditional HAI case-finding methods were developed in an era when patients' lengths of hospitalization were much longer than they are today, allowing most HAIs to be detected during the hospital stay. However, for SSIs in particular, the current climate of short stays and rapid transfers to other facilities makes accurate detection difficult

because as many as 50% of SSIs do not become evident until after hospital discharge or transfer (13). Since there is no consensus on which postdischarge surveillance methods are the most accurate and practical for detection of SSIs (7), the limitations of current case-finding methods should be recognized if SSIs are selected for inclusion in mandatory reporting systems.

Validation of Data

A method to validate data should be considered in any mandatory reporting system to ensure that HAIs are being accurately and completely reported and that rates are comparable from hospital to hospital or among all hospitals in the reporting system. The importance of validation was emphasized by a CDC study of the accuracy of reporting to the NNIS system, which found that although hospitals identified and reported most of the HAIs that occurred, the accuracy varied by infection site (14).

Resources and Infrastructure Needed for a Reporting System

A reporting system can not produce quality data without adequate resources. At the institution level, trained personnel with dedicated time are required, e.g., infection control professionals to conduct HAI surveillance. At the system level, key infrastructure includes instruction manuals, training materials, data collection forms, methods for data entry and submission, databases to receive and aggregate the data, appropriate quality checks, computer programs for data analysis, and standardized reports for dissemination of results. Computer resources within reporting systems must include both hardware and software and a standard user interface. In order to collect detailed data on factors such as use of invasive devises (e.g., central lines), patient care location within the facility, and

type of operation, extensive data dictionaries and coding schema must be developed and maintained.

HAI Rates and Risk Adjustment

For optimal comparison purposes, HAI rates should be adjusted for the potential differences in risk factors. For example, in the NNIS system, device-associated infections are risk adjusted by calculating rates per 1,000 device-days (e.g., CLA-LCBI per 1,000 central line-days) and stratifying by unit type (15,16,17). For that system, risk adjustment of SSIs is done by calculating of operation-specific rates stratified by a standardized risk index (17,18,19). Although these methods do not incorporate all potential confounding variables, they provide an acceptable level of risk adjustment that avoids the data collection burden that would be required to adjust for all variables.

Risk adjustment is labor intensive because data must be collected on the entire population at risk (the denominator) rather than only the fraction with HAIs (the numerator). Risk adjustment can not correct for variability among data collectors in the accuracy of finding and reporting events. Further, current risk-adjustment methods improve but do not guarantee the validity of inter-hospital comparisons, especially comparisons involving facilities with diverse patient populations (e.g., community versus tertiary-care hospitals).

Valid event rates are facilitated by selecting events that occur frequently enough and at-risk populations that are large enough to produce adequate sample sizes. Unfortunately, use of stratification (e.g., calculation of rates separately in multiple categories) for risk adjustment may lead to small numbers of HAIs in any one category

and thereby yield unstable rates, as is the case of a small hospital with low surgical volume.

Producing Useful Reports and Feedback

Publicly released reports must convey scientific meaning in a manner that is useful and interpretable to a diverse audience. Collaboration between subject matter experts, statisticians, and communicators is necessary in developing these reports. The reports should provide useful information to the various users and highlight potential limitations of both the data and the methods used for risk adjustment. In a new reporting system, data should be examined and validated before initial release; in addition, sufficient sample size should be accumulated so that rates are stable at the time of public release. Lastly, feedback of performance data should be given to healthcare providers regularly so that interventions to improve performance can be implemented as quickly as possible. For example, feedback of SSI rates to surgeons has been shown to be an important component of strategies to reduce SSI risk (20).

Adapting Established Methods for Use in Mandatory Reporting Systems

Where appropriate, developers of reporting systems should avail themselves of established and proven methods of collecting and reporting surveillance data. For example, many of the methods, attributes, and protocols of CDC's NNIS system may be applicable for public reporting systems. A detailed description of the NNIS methodologies has been described elsewhere (17), and additional information on NNIS is available at www.cdc.gov/ncidod/hip/surveill/nnis.htm.

Most reporting systems, such as NNIS, use manual data collection methods. In most instances, information in computer databases, when available, can be substituted for

manually collected data (21,22). However, when manual data collection is necessary, alternate approaches include limiting reporting to well-defined and readily identifiable events, using simpler and more objective event definitions (23), and sampling to obtain denominators (24). These approaches could decrease the burden of data collection and improve the consistency of reporting among facilities. If data collection were simplified, expanding the number of infection types and locations in which they are monitored may become more feasible.

Potential Consequences of Mandatory Public Reporting Systems

Mandatory reporting of HAIs will provide consumers and stakeholders with additional information for making informed healthcare choices. Further, reports from private systems suggest that participation in an organized, ongoing system for monitoring and reporting of HAIs may reduce HAI rates (25,26). This same beneficial consequence may apply to mandatory public reporting systems. Conversely, as with voluntary private reporting, mandatory public reporting that doesn't incorporate sound surveillance principles and reasonable goals may divert resources to reporting infections and collecting data for risk adjustment and away from patient care and prevention; such reporting also could result in unintended disincentives to treat patients at higher risk for HAI. In addition, current standard methods for HAI surveillance were developed for voluntary use and may need to be modified for mandatory reporting. Lastly, publicly reported HAI rates can mislead stakeholders if inaccurate information is disseminated. Therefore, in a mandatory public report of HAI information, the limitations of current methods should be clearly communicated within the publicly released report.

Research and Evaluation Needs

Research and evaluation of existing and future HAI reporting systems will be needed to answer questions about 1) the comparative effectiveness and efficiency of public and private reporting systems and 2) the incidence and prevention of unintended consequences. Ongoing evaluation of each system will be needed to confirm the appropriateness of the methods used and the validity of the results.

Recommendations

The Healthcare Infection Control Practices Advisory Committee (HICPAC) proposes four overarching recommendations regarding the mandatory public reporting of healthcare-associated infections (HAIs). These recommendations are intended to guide policymakers in the creation of statewide reporting systems for healthcare facilities in their jurisdictions.

1. **Use established public health surveillance methods when designing and implementing mandatory HAI reporting systems.** This process involves:
   a. selection of appropriate process and outcome measures to monitor;
   b. selection of appropriate patient populations to monitor;
   c. use of standardized case-finding methods and data validity checks;
   d. provision of adequate support and resources;
   e. adjustment for underlying infection risk; and
   f. production of useful and accessible reports to stakeholders.

   Do not use hospital discharge diagnostic codes as the sole data source for HAI public reporting systems.
2. **Create a multidisciplinary advisory panel to monitor the planning and oversight of the operations and products of HAI public reporting systems.** This team should include persons with expertise in the prevention and control of HAIs.
3. **Choose appropriate process and outcome measures based on facility type and phase in measures gradually to allow time for facilities to adapt and to permit ongoing evaluation of data validity.** States can select from the

following measures as appropriate for hospitals or long-term care facilities in their jurisdictions.

a. Three process measures are appropriate for hospitals and one (iii below) is appropriate for long-term care facilities participating in a mandatory HAI reporting system (Table 1).

   i. Central-line insertion practices (with the goal of targeting intensive care unit [ICU]-specific central line-associated, laboratory-confirmed bloodstream infections [CLA-LCBIs] can be measured by all hospitals that have the type of ICUs selected for monitoring (e.g., medical or surgical).

   ii. Surgical antimicrobial prophylaxis (with the goal of targeting surgical site infection [SSI] rates) can be measured by all hospitals that conduct the operations selected for monitoring.

   iii. Influenza vaccination coverage rates for healthcare personnel and patients can be measured by all hospitals and long-term care facilities. For example:

      1. Coverage rates for healthcare personnel can be measured in all hospitals and long-term care facilities.
      2. Coverage rates for high-risk patients can be measured in all hospitals.
      3. Coverage rates for all residents can be measured in all long-term care facilities.

b. Two outcome measures are appropriate for some hospitals participating in a mandatory HAI reporting system (Table 2).

   i. CLA-LCBIs.

   ii. SSIs following selected operations.

   Hospitals for which these measures are appropriate are those in which the frequency of the HAI is sufficient to achieve statistically stable rates. To foster performance improvement, the HAI rate to be reported should be coupled with a process measure of adherence to the prevention practice known to lower the rate (see 3ai and 3aii). For example, hospitals in states where reporting of SSIs is mandated should monitor and report adherence to recommended standards for surgical prophylaxis (see 3aii).

4. **Provide regular and confidential feedback of performance data to healthcare providers.** This practice may encourage low performers to implement targeted prevention activities and increase the acceptability of the public reporting systems within the healthcare sector.

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Table 1. Recommended Process Measures for a Mandatory Public Reporting System on Healthcare-associated Infections

Events	Measures	Rationale for Inclusion	Potential Limitations
Central line insertion (CLI) practices	Two measures (expressed as a percentage) (8): Numerators: Number of CLI in which: 1) Maximal sterile barrier precautions were used 2) Chlorhexidine gluconate (preferred), tincture of iodine, an iodophor, or 70% alcohol used as skin antiseptic Denominator: Number of CLIs	Unambiguous target goal (100%). Risk-adjustment is unnecessary. Proven prevention effectiveness (8): Use of maximal barrier precautions during insertion and chlorhexidine skin antisepsis have been shown to be associated with an 84% and 49% reduction in central line-associated bloodstream infection rates, respectively (27,28).	Methods for data collection not yet standardized. Manual data collection likely to be tedious and labor intensive, and data are not included in medical records.
Surgical antimicrobial prophylaxis (AMP)	Three measures (expressed as a percentage) (29): Numerators: Number of surgical patients: 1) Who received AMP within 1 hour prior to surgical incision (or 2 hours if receiving vancomycin or a fluoroquinolone) 2) Who received AMP recommended for their surgical procedure 3) Whose prophylactic antibiotics were discontinued within 24 hours after surgery end time Denominator: All selected surgical patients	Unambiguous target goal (100%). Risk-adjustment is unnecessary. Proven prevention effectiveness (7): Administering the appropriate antimicrobial agent within 1 hour before the incision has been shown to reduce surgical site infections (SSIs). Prolonged duration of surgical prophylaxis (>24 hrs) has been associated with increased risk of antimicrobial-resistant SSI.	Manual data collection may be tedious and labor intensive, but data can be abstracted from medical records.

Influenza vaccination of patients and healthcare personnel	Two measures (each expressed as a percentage of coverage) (30): Numerators: Number of influenza vaccinations given to eligible patients or healthcare personnel Denominators: Number of patients or healthcare personnel eligible for influenza vaccine	Proven prevention effectiveness (30-32): Vaccination of high-risk patients and healthcare personnel has been shown to be effective in preventing influenza .	Manual data collection may be tedious and labor intensive.

Table 2. Recommended Outcome Measures for a Mandatory Public Reporting System on Healthcare-associated Infections

Events	Measures	Rationale for Inclusion	Potential Limitations
1. Central line-associated laboratory-confirmed primary bloodstream infection (CLA-LCBI)*	Numerator: Number of CLA-LCBI Denominator: Number of central-line days in each population at risk, expressed per 1,000 Populations at risk: Patients with central lines cared for in different types of intensive care units (ICUs)* Risk stratification: By type of ICU Frequency of monitoring: 12 months per year for ICU with ≤5 beds; 6 months per year for ICU with >5 beds Frequency of rate calculation: Monthly (or quarterly for small ICUs) for internal hospital quality improvement purposes Frequency of rate reporting: Annually using all the data to calculate the rate	Overall, an infrequent event but one that is associated with substantial cost, morbidity, and mortality. Reliable laboratory test available for identification (i.e., positive blood culture). Prevention guidelines exist (8) and insertion processes can be monitored concurrently. Sensitivity*: 85%; predictive value positive (PVP)*: 75% (14)	LCBI* can be challenging to diagnose since the definition includes criteria that are difficult to interpret (e.g., single-positive blood cultures from skin commensal organisms may not represent true infections.) To offset this limitation, a system could include only those CLA-LCBI identified by criterion 1, which will result in smaller numerators and therefore will require longer periods of time for sufficient data accumulation for rates to become stable/meaningful. Standard definition of central line* requires knowing where the tip of the line terminates, which is not always documented and can therefore lead to misclassification of lines.

Events	Measures	Rationale for Inclusion	Potential Limitations
2. Surgical site infection (SSI)*	Numerator: Number of SSI for each specific type of operation* Denominator: Total number of each specific type of operation, expressed per 100 Risk stratification: Focus on high-volume operations and stratify by type of operation and National Nosocomial Infections Surveillance (NNIS) SSI risk index* Alternate risk adjustment: For low-volume operations, by standardized infection ratio*	Low frequency event but one that is associated with substantial cost, morbidity, and mortality. Prevention guidelines exist (7) and certain important processes can be monitored concurrently. Sensitivity*: 67%; PVP*: 73% (14)	Rates dependent on surveillance intensity, especially completeness of post-discharge surveillance (50% become evident after discharge and may not be detected). SSI definitions include a "physician diagnosis" criterion, which reduces objectivity.

*See Glossary.

GLOSSARY

- **Central line**: A vascular infusion device that terminates at or close to the heart or in one of the great vessels. In the National Healthcare Safety Network (NHSN), the system replacing NNIS, the following are considered great vessels for the purpose of reporting central-line infections and counting central-line days: aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, and common femoral veins.

  NOTE: In neonates, the umbilical artery/vein is considered a great vessel.

  NOTE: Neither the location of the insertion site nor the type of device may be used to determine if a line qualifies as a central line. The device must terminate in one of these vessels or in or near the heart to qualify as a central line. NOTE: Pacemaker wires and other noninfusion devices inserted into central blood vessels or the heart are not considered central lines.
- **CLA-LCBI**: please see **Laboratory-confirmed primary bloodstream infection.**
- **Confounding**: The distortion of the apparent effect of an exposure on risk brought about by the association with other factors that can influence the outcome (33). Risk adjustment is performed to minimize the effects of patient co-morbidities and use of invasive devices (the confounding factors) on the estimate of risk for a unit or facility (the exposure).
- **Device-associated infection**: An infection in a patient with a device (e.g., ventilator or central line) that was used within the 48-hour period before the infection's onset.

If the time interval was longer than 48 hours, compelling evidence must be present to indicate that the infection was associated with use of the device. For catheter-associated urinary tract infection (UTI), the indwelling urinary catheter must have been in place within the 7-day period before positive laboratory results or signs and symptoms meeting the criteria for UTI were evident (17).

- **Healthcare-associated infection**: A localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that a) occurs in a patient in a healthcare setting (e.g., a hospital or outpatient clinic), b) was not found to be present or incubating at the time of admission unless the infection was related to a previous admission to the same setting, and c) if the setting is a hospital, meets the criteria for a specific infection site as defined by CDC (17). (See also **Nosocomial**.)
- **Intensive-care unit (ICU)**: A hospital unit that provides intensive observation, diagnostic, and therapeutic procedures for adults and/or children who are critically ill. An ICU *excludes* bone marrow transplant units and nursing areas that provide step-down, intermediate care or telemetry only. The type of ICU is determined by the service designation of the majority of patients cared for by the unit (i.e., if 80% of the patients are on a certain service [e.g., general surgery], then the ICU is designated as that type of unit [e.g., surgical ICU]). An ICU with approximately equal numbers of medical and surgical patients is designated as a combined medical/surgical ICU (17).
- **Laboratory-confirmed primary bloodstream infection (LCBI)**: A primary bloodstream infection identified by laboratory tests with or without clinical signs or

symptoms; most often associated with the use of catheters or other invasive medical devices. For the CDC surveillance definition of LCBIs, please see reference 14 or www.cdc.gov/ncidod/hip/surveill/nnis.htm.

- **NNIS SSI Risk index**: A score used to predict a surgical patient's risk of acquiring a surgical-site infection. The risk index score, ranging from 0 to 3, is the number of risk factors present among the following: a) a patient with an American Society of Anesthesiologists' physical status classification score of 3, 4, or 5 (34), b) an operation classified as contaminated or dirty infected (35,36), and c) an operation lasting over T hours, where T depends upon the operation being performed (19). Current T values can be found in the NNIS Report at www.cdc.gov/ncidod/hip/surveill/nnis.htm.
- **Nosocomial**: Originating or taking place in a hospital.
- **Outcomes**: All the possible results that may stem from exposure to a causal factor or from preventive or therapeutic interventions (33) (e.g., mortality, cost, and development of a healthcare-associated infection).
- **Predictive value positive**: The proportion of infections reported by a surveillance or reporting system that are true infections (6,14).
- **Private reporting system**: A system that provides information about the quality of health services or systems for the purposes of improving the quality of the services or systems. By definition, the general public is not given access to the data; instead, the data are typically provided to the organization or healthcare workers whose performance is being assessed. The provision of these data is intended as an intervention to improve the performance of that entity or person.

- **Process measure:** A measure of recommended infection control or other practices (e.g., compliance with hand hygiene recommendations).
- **Public reporting system:** A system that provides the public with information about the performance or quality of health services or systems for the purpose of improving the performance or quality of the services or systems.
- **Risk adjustment**: A summarizing procedure for a statistical measure in which the effects of differences in composition (e.g., confounding factors) of the populations being compared have been minimized by statistical methods (e.g., standardization and logistic regression) (33).
- **Sensitivity**: The proportion of true infections that are reported by a surveillance or reporting system. May also refer to the ability of the reporting system to detect outbreaks or unusual clusters of the adverse event (in time or place) (6,14).
- **SSI Risk Index**: please see **NNIS SSI Risk Index.**
- **Standardized infection ratio**: The standardized infection ratio as used in this document is an example of indirect standardization in which the observed number of surgical site infections (SSIs) is divided by the expected number of SSIs. The expected number of SSIs is calculated by using NNIS SSI risk index category-specific data from a standard population (e.g., the NNIS system data published in the NNIS Report) and the number of operations in each risk index category performed by a surgeon, a surgical subspecialty service, or a hospital. [Detailed explanation and examples can be found in Horan TC, Culver DH. Comparing surgical site infection rates. In: Pfeiffer JA, Ed. APIC text of infection control

and epidemiology. Washington, DC: Association for Professionals in Infection Control, 2000. Chapter 14, p. 1-7.]

- **Surgical site infection (SSI)**: An infection of the incision or organ/space operated on during a surgical procedure. For the CDC surveillance definition of an SSI, please see reference 14 or www.cdc.gov/ncidod/hip/surveill/nnis.htm.
- **Surveillance**: The ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health (6).

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