

TABLE 3.—REGULATORY COSTS (IN MILLIONS) BY YEAR

Evaluation Year	Investment During Year	Operating and Maintenance Cost
1	\$23.2	\$0.9
2	\$9.5	\$1.0
3	\$9.5	\$1.1
4	0	\$1.1
5	0	\$1.1
6	0	\$1.1
7	0	\$1.1
8	0	\$1.1
9	0	\$1.1
10	0	\$1.1
11	\$1.4	\$1.1
12	\$1.4	\$1.1
13	\$1.4	\$1.1
14	0	\$1.1
15	0	\$1.1
16	0	\$1.1
17	0	\$1.1
18	0	\$1.1
19	0	\$1.1
20	0	\$1.1

G. Other Anticipated Expenditures

We anticipate that the proposed rule would affect all facilities defined as hospitals and included in NAICS 622, including general medical and surgical hospitals, psychiatric and substance abuse hospitals, and other specialty hospitals. We did not quantify impacts on nursing and residential care facilities (NAICS 623). The proposed rule would impact hospitals by encouraging them to accelerate the efficient use of bar code reading technology in hospital bedside point of care settings. The expected increased investment would lead to a significant reduction in the number of ADEs among hospital patients. We assume that investments by the health care sector are made at the beginning of each period.

The hospital sector has long considered the application of bar code reading technology for its facilities. According to the AHA, almost half of the hospitals in the United States have explored the possibility of independently installing this technology. A few (about four percent of all hospitals) are currently using some form of computerized systems in their medication processes, and half of them use bar codes in everyday practice. However, because hospitals currently have no standardized bar coded information for all therapeutic products, each hospital must generate and internally affix bar codes that are only applicable within that specific facility. In some cases, hospitals overpackage drug products in order to make current scanning systems usable. This extra effort reduces the expected efficiency of the bar code reading systems and has been a barrier to the general acceptance

of readable technology. Standardized universal codes would remove this impediment and encourage health care facilities to invest and use technology to reduce patient ADEs.

Hospital facilities will face significant capital investments and significant process changes in order to implement bar code reading and scanning technology. ERG estimated that the average initial cost to a typical hospital for installation of scanners, readers, software, initial training etc. is \$377,000.⁹ In addition, although there is considerable uncertainty, ERG contacted hospital industry executives and consultants who agreed that negative productivity effects were likely after installation of a bar code reading system. The contacts noted that using the scanners could result in reductions in patient ward productivity because current scanners and administration procedures would have to be revised to accommodate this technology. Difficulties could arise, for example, when multiple doses of medication are required at the same time for different patients and when current administrative practices, such as pre-preparing certain medication, could not be accommodated with the bar code reading systems. Also, moving the scanner and reader from room to room, not adequately reading the bar code on one swipe, and other procedural changes might result in operational inefficiencies. It is possible (and hopeful) that long-term process changes would moderate or eliminate these

⁹ Per hospital expenditures and benefits are based on an average sized hospital based on bed capacity. The average United States hospital has 191 beds (ASHP, 1999).

potential inefficiencies, but our analysis assumes that hospital ward productivity levels would fall by three percent annually over the evaluation period. The annual opportunity costs of these productivity losses, together with the operation and maintenance expenses, amount to \$320,000 per year for the average sized hospital. Some of these expected productivity losses would be mitigated by efficiency gains in other hospital procedures and are discussed later.

Despite these costs, interviews with consultants in the field of health care technology indicate that hospitals are gradually making this commitment. Experts have predicted that in the absence of this proposed rule, the hospital sector would likely install bar code readable technology within 20 years. Therefore, we believe that, while approximately 131 hospitals currently use bar codes in everyday operations, the remaining 6,460 hospitals would ultimately invest in this technology. The experts have also predicted that if standardized bar code information on medications were available to allow scanning systems to capture information without requiring in-facility labeling systems, many hospitals would make these investments much earlier. For example, ERG estimated that if in-hospital pharmacy operations were no longer required to repackage and relabel products because of the proposed rule, the annual operating and maintenance costs of a bar code scanning system would fall from \$377,000 to \$314,800. Thus, we believe that the proposed rule would effectively prompt facilities to accelerate these investments.