

cessation lag model either over-states or under-states the rate at which population risk reduction for bladder cancer occurs following DBP exposure reductions.

EPA is currently examining the recently published meta-analysis by Villanueva *et al.* (2003) to determine if the information provided on increases in risk as a function of duration of exposure can provide any insight on how reductions in risk over time might occur following reductions in exposure. Villanueva *et al.* (2003) demonstrated that the risk associated with chlorinated drinking water and bladder cancer are related to exposure duration. Specifically, they estimated a unit increase in the odds ratio of 1.006 per year (95% CI of 1.004 to 1.009). The model suggests a cumulative odds ratio of 1.13 after 20 years of exposure (95% CI of 1.08 to 1.20), and 1.27 (95% CI of 1.17 to 1.43) after 40 years. This result is consistent with most of the individual studies which do not show statistically significant risk increases until at least 30–40 years of exposure. However, these studies provide indirect evidence only about the latency of potential effects. For perspective, it is important to note that the latency between initiation of exposure and an increase in lung cancer risk is approximately 20 years. As noted above, latency is not the same as the cessation lag. EPA is requesting comment on (a) the potential application of the Villanueva *et al.* (2003) model to estimate reductions in bladder cancer risk that might accompany decreased exposure to DBPs as a result of the Stage 2 Rule; (b) the advantages and disadvantages of using the current approach—*i.e.*, application of the smoking cessation lag model; and (c) suggestions for alternative data sets or approaches to characterize cessation lag.

In addition to the delay in reaching a new steady-state level of risk reduction

as a result of cessation lag effects, there is a delay in exposure reduction resulting from the Stage 2 DBPR implementation. In general, EPA assumes that a fairly uniform increment of systems will complete installation of new treatment technologies each year, with the last systems installing treatment by 2013. EPA recognizes that more systems may start in early or later years, but believes that a uniform schedule is a reasonable assumption. Appendix D of the EA presents detailed information regarding the rule activity schedule assumptions (USEPA 2003i).

The delay in exposure reduction resulting from the rule implementation schedule is incorporated into the benefits model by adjusting the cessation lag weighting factor. For example, if ten percent of systems install treatment equipment (and start realizing reductions in cancer cases) in year one, only that portion of the cases are modeled to begin the cessation lag equilibrium process in that year. Thus, the resulting “weighted weighting factor” is higher relative to the base factor. Appendix E in the EA (USEPA 2003i) presents detailed breakdowns of all weighting factor adjustments and resulting cancer cases avoided, by year, for each rule alternative based on the application of the cessation lag methodology.

### 3. Benefit Sensitivity Analyses

The Agency performed one other benefit sensitivity analysis which is included in the EA to allow for comparison with the benefit estimates calculated for the Stage 1 DBPR. This analysis assumes that there is not a cessation lag or latency adjustment associated with bladder cancer reductions that result from the rule. In this case, the analysis assumes that the steady state reduction in bladder cancer occurs immediately with rule implementation. This is the same

methodology used to estimate the quantified benefits of the Stage 1 DBPR.

### D. Costs of the Proposed Stage 2 DBPR

In estimating the costs of today’s proposed rule, the Agency considered impacts on water systems (CWSs and NTNCWSs) and on States (including territories and EPA implementation in non-primacy States). EPA assumed that systems would be in compliance with the Stage 1 DBPR, which has a compliance date of January 2004 for ground water systems and small surface water systems and January 2002 for large surface water systems. Therefore, the cost estimate only considers the additional requirements that are a direct result of the Stage 2 DBPR. More detailed information on cost estimates are described later and a complete discussion can be found in Chapter 6 of the Stage 2 DBPR EA (USEPA 2003i)

#### 1. National cost estimates

EPA estimates that the mean annualized cost of the proposed rule ranges from approximately \$59.1 million using a three percent discount rate to \$64.6 million using a seven percent discount rate. Drinking water utilities will incur approximately 98 percent of the rule’s costs. States will incur the remaining rule cost. Tables VII–5 a and b summarize the total annualized cost estimates for the proposed Stage 2 DBPR. In addition to mean estimates of costs, the Agency calculated 90 percent confidence bounds by considering the uncertainty around the mean unit technology costs. Table VII–6 shows the undiscounted capital cost and all one-time costs broken out by rule component. A table comparing total annualized costs among the regulatory alternatives considered by the Agency is located in subsection VII.G.

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