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Derivation of Prostate Cancer Prevalence by Age and Tumor Volume

This appendix describes the derivation of age-specific prevalence rates of latent prostate cancer (overall and by tumor volume) presented in table 2-5. Overall prevalence data for each age strata were derived by Office of Technology Assessment contractors from eight available autopsy series that specifically excluded cases where prostate cancer had been clinically suspected, and that provided complete age-specific prevalence by decade (24, 113, 128, 134, 159, 222, 293, 305). All eight were consecutive unselected autopsy series; seven were U.S. hospital-based, one (Lundberg) was a community-based Swedish series. All eight used serial step-sectioning (usually 4 mm slices) of the entire gland.

The estimates for each prostate cancer volume and capsular status stratum were derived by applying volume data from McNeal (233) to the derived age-specific prevalences. McNeal and colleagues performed morphometric autopsy analyses on 100 consecutive unselected prostates with adenocarcinoma. For all ages, 60 percent of all cancers are assumed to be 0.5 mL or less even though cancers in men below age 70 years were somewhat more likely to be less than 0.5 mL in volume

than for men 70 years and older (68 percent vs. 56 percent).

The remaining 40 percent were assumed to be greater than 0.5 mL in volume. In deriving the distribution of intracapsular and extracapsular tumors for these larger cancers, extracapsular spread was required to be greater than 1 cm beyond capsule, although half of tumors with volume above 0.5 mL in the McNeal study showed some lesser degree of capsular penetration.¹ Although McNeal's and other's (180, 244) data suggest the proportion of cancers above 0.5 mL that are extracapsular increases for men over 70 years, the wide confidence intervals around these estimates lead us to apply a uniform 27 percent probability for all ages. Hence, we assume that of all cancers more than 0.5 mL, 27 percent are extracapsular and 73 percent are intracapsular.

Several studies of incidental prostate cancer among patients undergoing cystoprostatectomy for bladder cancer (180, 244, 328) suggest that only 20 percent of unrecognized prostate cancers exceed 0.5 mL. However, a recent autopsy series of 105 patients without history of prostate cancer and with recent normal rectal exams

¹ See figure 5 in the study by McNeal and colleagues (233).

(mean age 66, not stratified) found a 35 percent prevalence of prostate cancer with 41 percent >0.5 mL; two-thirds of these larger cancers were intracapsular (49).

Looking only at men over age 50 as a single group from the eight autopsy studies yields an overall prevalence of prostate cancer of 30 percent. Breaking these

cancers down by volume for all men over age 50, the estimated weighted prevalence of cancers less than 0.5 mL is 18 percent, the prevalence of intracapsular cancers exceeding 0.5 mL is 8.8 percent, and the prevalence of extracapsular cancer exceeding 0.5 mL is 3.2 percent.