ELSEVIER

Urologic Oncology: Seminars and Original Investigations 32 (2014) 42.e7–42.e12

UROLOGIC ONCOLOGY

Original article

A manpower calculus: The implications of SUO fellowship expansion on oncologic surgeon case volumes

William A. See, M.D.*

Department of Urology, Medical College of Wisconsin, Milwaukee, WI

Received 26 March 2013; received in revised form 8 May 2013; accepted 9 May 2013

Abstract

Introduction: Society of Urologic Oncology (SUO)-accredited fellowship programs have undergone substantial expansion. This study developed a mathematical model to estimate future changes in urologic oncologic surgeon (UOS) manpower and analyzed the effect of those changes on per-UOS case volumes.

Materials and methods: SUO fellowship program directors were queried as to the number of positions available on an annual basis. Current US UOS manpower was estimated from the SUO membership list. Future manpower was estimated on an annual basis by linear senescence of existing manpower combined with linear growth of newly trained surgeons. Case-volume estimates for the 4 surgical disease sites (prostate, kidney/renal pelvis, bladder, and testes) were obtained from the literature. The future number of major cases was determined from current volumes based upon the US population growth rates and the historic average annual change in disease incidence. Two models were used to predict future per-UOS major case volumes. Model 1 assumed the current distribution of cases between nononcologic surgeons and UOS would continue. Model 2 assumed a progressive redistribution of cases over time such that in 2043 100% of major urologic cancer cases would be performed by UOSs.

Results: Over the 30-year period to "manpower steady-state" SUO-accredited UOSs practicing in the United States have the potential to increase from approximately 600 currently to 1,650 in 2043. During this interval, case volumes are predicted to change 0.97-, 2.4-, 1.1-, and 1.5-fold for prostatectomy, nephrectomy, cystectomy, and retroperitoneal lymph node dissection, respectively. The ratio of future to current total annual case volumes is predicted to be 0.47 and 0.9 for models 1 and 2, respectively. The number of annual US practicing graduates necessary to achieve a future to current case-volume ratio greater than 1 is 25 and 49 in models 1 and 2, respectively.

Conclusions: The current number of SUO fellowship trainees has the potential to decrease future per-UOS case volumes relative to current levels. Redistribution of existing case volume or a decrease in the annual number of trainees or both would be required to insure sufficient surgical volumes for skill maintenance and optimal patient outcomes. Published by Elsevier Inc.

Keywords: Manpower; Case volumes

1. Introduction

It is said that imitation is the highest form of flattery. For those who have committed themselves to a profession, who believe in the value of that commitment and derive great satisfaction from it, few things are more gratifying than to see others choose that same path. An added bonus to seeing others choose the same career is personal involvement in the development of those young colleagues. In some respects close involvement in the education and training of future associates is the professional analogy to our biologic offspring. Our trainees represent our legacy, our "professional DNA," through which we have hope of a more enduring effect on our field.

Against this backdrop it is not surprising that in recent years there has been a proliferation of fellowship programs in the field of urologic oncology. In an appropriate effort to ensure the quality of these programs our society, the Society of Urologic Oncology (SUO), has implemented a process through which to accredit these programs. Although fellowship expansion has clear benefits, the potential to train an oversupply of urologic cancer surgeons represents a downside risk. The well-documented linkage of outcomes to surgeon volume implies the need to carefully link provider supply to patient demand in an effort to optimize outcomes [1–9].

This work was supported by the Department of Veterans Affairs and the Milwaukee Veterans Affairs Medical Center.

* Tel.: +1-414-805-0787; fax: +1-414-805-0771.

E-mail address: cziebell@mcw.edu

1078-1439/$ – see front matter Published by Elsevier Inc.
http://dx.doi.org/10.1016/j.urolonc.2013.05.003

The current study employed a mathematical model to predict the effect of the number of fellowship graduates on future "per-surgeon" case volumes. Incorporating population growth rates, changing cancer incidence rates, and the anticipated retirement rate of the current pool of Urologic Oncologic Surgeon (UOS), the model predicts a more than 2-fold reduction in per-surgeon case volume prior to the system reaching steady state. Models in which 100% of the current oncologic case volume is managed by fellowship-trained specialist demonstrate a 1.1-fold reduction in case volume relative to today's levels. These findings support a need to carefully consider and manage the supply side of the manpower equation.

2. Materials and methods

2.1. Number of trainees

SUO-accredited fellowship training programs in the United States were identified through the SUO member website. Each training site was contacted via email requesting information regarding the number of fellows accepted into the program on an annual basis. Two programs responded with a "narrow range" of annual acceptance and in both of these cases the higher number was employed in calculating the maximal possible number of annual graduates. For the purpose of the analysis, programs were assumed to fill completely and have all graduates practice within the United States. New graduates were assumed to have a 30-year professional career prior to leaving the workforce.

2.2. Total manpower calculations

The SUO membership list was queried to identify members listing themselves as "Urologists" and having an address in the United States. Approximately 600 members met those criteria and were assumed to be either current or "soon-to-be" practicing UOSs. It was estimated that 3.33% of the exiting 600 SUO members would leave the workforce on an annual basis (30-y professional career). Total urologic oncologic surgical manpower was calculated on an annual basis from 2014 to 2043 as the sum of practicing (not retired) current SUO members and the number of "new-to-date" SUO fellowship graduates.

2.3. Oncologic case-volume estimates

Estimates for the annual current number of major oncologic procedures performed for each of the 4 principal disease sites (prostatectomy, nephrectomy partial or total, cystectomy, and retroperitoneal lymph node dissection [RPLND]) were obtained from the literature [10–12]. Future case volumes were calculated by correcting for the US population growth and changing annual disease incidence rates using Surveillance, Epidemiology, and End Results data for the period from 2000 to 2009 [13,14].

2.4. Per-surgeon case volumes

Per-surgeon case volume for each of the 4 case types was calculated by dividing the number of annual available cases by the corresponding number of annual UOSs. Two scenarios were employed to determine the effect of manpower growth on the absolute number of cases per surgeon. In model 1, the number of available cases was estimated as a fraction of the total case number to reflect the fact that currently substantial numbers of urologic oncologic procedures are performed by nononcologists. The fraction of total oncologic cases currently performed by UOSs were estimated to be 0.5, 0.5, 0.75, and 0.9 for prostatectomy, nephrectomy, cystectomy, and RPLND, respectively. In model 2, 100% of available cases at the 30-year manpower steady-state horizon (2043) were assumed to be performed by SUO-accredited surgeons. In the interval between 2014 and 2043, the percentage of cases performed by SUO surgeons is assumed to increase at a fixed rate of 3.3% of the difference between current case percentages and 100%, annually.

2.5. Work relative value units (wRVU) estimations

As a check of model validity, and to contextualize the contribution of surgical oncology to overall provider practice activity, current surgical volume estimates were used to calculate current and future per physician wRVUs associated with the care of patients with urologic cancer based upon Medicare wRVU values. wRVU estimates combined average wRVUs for each procedure type with associated evaluation and management activity for those cases. wRVUs generated by evaluation and management (E&M) activity estimated new patient wRVUs by disease site as "wRVUs = (annual incidence/case volume)*level 4 new patient visit wRVUs." Model 1 and 2 assumed newly diagnosed and established patients were seen by a UOS proportionate to the models' case-distribution assumptions (fractional vs. all). Established patient volumes used an established to new patient ratio of "2" to calculate the number of annual established patient visits relative to new patient visits. wRVUs for established patients assumed level 3 established patient coding. RVUs were benchmarked to the median values for Medical Group Management Association adult academic urology [15].

Table 1 lists all of the model variables and their chosen values.

3. Results

One hundred percent of SUO-accredited fellowship programs responded to the request for information on their