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February 25, 2016

Rep. Marilyn Avila (co-chair)
Rep. Josh Dobson (co-chair)
Senator Louis Pate (co-chair)
Joint Legislative Oversight Committee
on Health and Human Services
North Carolina General Assembly
Legislative Office Bldg.
16 West Jones Street
Raleigh, North Carolina
27601

Dear Rep. Avila, Rep. Dobson, and Sen. Pate:

My thanks again for the opportunity to address the committee regarding our report on the Benefits of Less Restrictive Regulation of APRNs in North Carolina.

I left several questions unanswered when I testified on February 9. My responses follow.

1. **Current Physician Shortages in NC**. I believe Sen. Hise largely addressed this question by referring members to previous testimony by Sheps Center experts on this issue. Here is some additional information that may be of use.
    - Table C-8 from our report shows that we estimated a shortage of 1,066 to 3,085 nonfederal physicians in 2020, of which 319 to 922 would be non-OB-GYN primary care doctors, 204-295 would be OB/GYNs and 166-428 would be anesthesiologists.
    - According to AAMC's most recent North Carolina Physician Workforce Profile (2015), our state ranks below average in terms of the 2014 supply of both primary care and specialty physicians per 100,000 population.[1] Just to match the number of MDs/100,000 in the median state would require an increase of 955 active patient care MDs and 507 primary care MDs (this is a crude way to measure "shortage" but gives some rough sense of NC's situation absent state-specific shortage projections from AAMC).
    - When you consider that our figures are for 2020 and that AAMC projects a growing shortage of MDs that will rise to 46,000 to 90,000 by 2025[2]
      , both of these rough estimates of shortages fall within the ranges used in our report.
    - The one exception relates to anesthesiologists (MDAs). As noted in my second to last slide, our shortage estimates were based on a 2010 RAND study showing that North Carolina had an 8.2% shortage of MDAs in 2007 (see Table C-8 in our report for citation). In 2014—too late for inclusion in our report—RAND published a follow-up study showing virtually no shortage of MDAs in 2013.

[1] Available at: https://www.aamc.org/download/447212/data/northcarolinaprofile.pdf.
[2] Available at: https://www.aamc.org/download/426260/data/physiciansupplyanddemandthrough2025keyfindings.pdf.

However, I hasten to add:

- Even this RAND report showed shortages beginning to re-emerge by the year 2017[3] (unfortunately no state-specific projections were provided by RAND researchers).
- The RAND report projected future demand for anesthesiologists by extrapolating the estimated 0.37 percent increase in surgeries based on 10-year historical growth. It did not account for any increase in demand due to the Affordable Care Act, whereas our report appropriately estimates this will increase demand by anywhere from 3.1 to 5.7%.
- Moreover, part of the reason the RAND-estimated national shortage of 2,000 anesthesiologists in 2007 changed to a surplus of 300 anesthesiologists by 2013 was because demand for surgeries declined during the recession, which now most definitely is over.
- Thus, taking the RAND update into account would roughly reduce our lower bound estimate of the MDA shortage projected for 2020 by 42% (reducing the size of the projected shortage by 70 MDAs). It would reduce our upper bound estimate by 11% (roughly 48 MDAs). These adjustments represent a relatively small fraction of the estimated 1,259 MD equivalents for which expanded use of APRNs might substitute under less restrictive regulation. Thus, they do not appreciably alter our overall results.

2. **NPs and Health Quality**. The following is the section of our report related to NP quality (p. II-1): Reagan and Salsberry (2013) cite 7 studies that demonstrate NP outcomes are equivalent to those of physicians, including 2 systematic reviews[4] (Horrocks et al., 2002; Newhouse et al., 2011), a literature summary (Naylor & Kurtzman, 2010) and four randomized controlled trials (Dierick-van Daele et al., 2009; Laurant et al. 2004; Mundinger et al., 2000; Spitzer et al., 1974). The most recent and thorough of the systematic review (Newhouse et al., 2011) examined 37 studies, concluding that when comparing NP and MD care, there is a high level of evidence to support equivalent levels of a) patient satisfaction; b) self-reported health status; c) functional status outcomes; d) glucose control; e) blood pressure control; and f) mortality rates. There also is a high level of evidence to support better management of patient serum lipid levels by NPs.

   Several recent studies have reinforced this general picture. Oliver et al. (2014a) found that 2012 state health rankings reported by the United Health Foundation were higher in states where full independent practice of NPs is permitted than in states without full practice. This finding was re-confirmed in Oliver et al. (2014b), which further showed that states with full practice had better health outcomes on several other statewide measures of health, including a) potentially avoidable hospitalizations for Medicare-Medicaid beneficiaries; b) hospital readmission within 30 days discharge from rehabilitation and c) annual hospitalizations of nursing home patients. Kleiner et al., (2014) find no impact on infant mortality of loosening restrictions on NP prescribing authority. The Bay Area Council Economic Institute reported "In years following increased NP authority, adults report a 13-15 percent increase in visit quality, while children report gains of 17-27 percent" (BACEI, 2014).

3. **CNMs and Health Quality**. The following is the section of our report related to NP quality (p. II-2): The most recent and thorough systematic review (Newhouse et al., 2011; also reported in Johantgen et al. 2012)

[3] See p. 79 http://www.rand.org/content/dam/rand/pubs/research_reports/RR600/RR650/RAND_RR650.pdf.

[4] A systematic literature review is performed in a transparent and rigorous manner, with very explicit rules about which studies to include and exclude, as well as the criteria by which studies will be assessed. For example, evidence from randomized controlled trials (RCTs) generally is accorded a higher weight than evidence from case studies or less rigorous cohort studies in which part of any observed outcome difference may be the result of patients with more favorable characteristics self-selecting into one of the comparison groups. For example, if healthier patients tend to see APRNs, this would make outcomes for APRN patients better than for doctors even if both groups were actually being treated identically. By grading the quality of the scientific evidence supporting a given conclusion, those conducting a systematic review can make states about whether each of its conclusions is supported by a high, moderate or low level of evidence. A group that examined the quality of the Newhouse et al. review concluded: "This review concluded that advanced practice registered nurses provided safe, effective and quality care in a variety of settings and in partnership with physicians and other providers had a significant role in the promotion of health. There were questions about data quality and some of the review methods, but the relatively conservative conclusions appear reasonable" (CRD, 2012).

examined 21 studies, concluding that when CNM and MD care is compared, there is a high level of evidence to support that CNMs have a) similar infant APGAR scores; and b) equivalent levels of low birthweight infants; c) comparable or lower rate of NICU admissions; and d) lower likelihood of perineal lacerations. There is moderate to high evidence that CNMs, when compared to MDs. have similar or better outcomes using fewer interventions including epidural, episiotomy, and induction of labor. There is a moderate level of evidence to support higher rates of breastfeeding initiation in the CNM group.

4. **CRNAs and Health Quality**.
    - The following is the section of our report related to CRNA quality (p. II-1): "The most recent and thorough systematic review (Newhouse et al., 2011) found that no studies of CRNAs met the criteria for inclusion in the review. The authors further noted that although numerous studies have reported on CRNA clinical interventions, very few studies have compared the outcomes of care involving CRNAs with other providers. Sparse data from single observational studies of low quality suggest equivalent complication rates and mortality when comparing care involving CRNAs with care involving only physicians. Hogan et al. (2010) note that anesthesia-related mortality rates are only 1.1 per million population (8.2 per million hospital surgical discharges). Likewise, the rate of adverse outcomes totally attributable to anesthesia is only 1.25 per 10,000 procedures. This makes it cost-prohibitive to conduct a study of sufficient size to detect any difference between CRNAs and anesthesiologists in either adverse outcomes or mortality. While the observational studies alluded to in Newhouse are not listed, Hogan et al. list 4 such studies (Hoffman et al., 2002; Needleman and Minnick, 2008; Pine et al., 2003; Simonson et al., 2007)."
    - There is a Cochrane Collaboration review (generally regarded as the "gold standard" of systematic reviews) published in 2014 (again, too late for inclusion in our report) that likewise concluded: "As none of the data were of sufficiently high quality and the studies presented inconsistent findings, we concluded that it was not possible to say whether there were any differences in care between medically qualified anaesthetists and nurse anaesthetists from the available evidence."[5]
    - Admittedly, there is a study by Silber (2000) which showed slightly higher mortality for unsupervised CRNAs compared to supervised CRNAs, but it a) was conducted in a single state (PA), hence this limits its generalizability; b) had high risks of both selection bias and performance bias; and c) the authors of the Cochrane review cited above concluded the following about these mortality results: "We assessed that co-morbidity had a high risk of imprecision and the remaining increased effect seen may have been due to residual confounding." In short, from a scientific point of view, the impartial Cochrane scientists concluded that not much weight should be attached to this finding.
    - Moreover, if one wishes to attach any credibility/importance to this single adverse study finding, then fairness would argue for considering two other similar observational studies unearthed in the Cochrane review: "One study stated that there was a lower rate of death for nurse anaesthetists compared to medically qualified anaesthetists. One study stated that the risk of death was lower for nurse anaesthetists compared to those being supervised by an anaesthetist or working within an anaesthetic team, whilst *another stated the risk of death was higher compared to a supervised or team approach*." [the italicized portion refers back to the Silber study earlier noted].
    - All of the foregoing are consistent with the conclusion that CRNA practice outcomes are equivalent to those of MDAs within their scope of practice. This, of course, is *not* equivalent to saying that

[5] Available at: http://www.cochrane.org/CD010357/ANAESTH_physician-anaesthetists-versus-nurse-anaesthetists-for-surgical-patients

CRNAs are equipped to handle the full range of cases for which MDAs are trained, as that would imply that the extra years of training by MDAs have no value whatsoever. Nor does it preclude the possibility of a CRNA occasionally delivering sub-standard care (just as there is no guarantee that an MDA will occasionally likewise do the same).

- The issue is what the average patient can typically expect for procedures that fall within a CRNA's scope of practice. My reading of the scientific evidence is that the weight of the evidence is in the direction of believing the outcomes will be the same regardless of whether the procedure is delivered by a CRNA permitted autonomous practice in a state such as Oregon or Washington or instead delivered by a fully board-certified anesthesiologist.
- What does seem clear is that anesthesia-related mortality and adverse outcomes are extraordinarily low regardless of whom is performing the procedure. And that is a credit to how the profession has over the past few decades adopted a "systems" approach to ascertaining and preventing the avoidable causes of anesthesia-related errors.

5. **CNAs and Health Quality**. The most recent and thorough systematic review (Newhouse et al., 2011) examined 11 studies, concluding that when comparing CNS and non-CNS providers, a high level of evidence supports equivalent group satisfaction scores. There is a moderate level of evidence to support that the CNS decreases complication rates associated with stroke, surgical and maternity patients. NACNS (2013) has summarized the results of at least 4 additional recent studies showing that various CNS interventions have reduced hospital-acquired infections by as much as 80 percent, resulting in lives saved in one study.

6. **Composition of Steering Committee**. I would like to take this opportunity to briefly address an additional comment that was critical of our using a steering committee without any physician members.
    - The central purpose of the steering committee was both to define the scope of work for this study and select a competent researcher who could perform the task. If the research task were how to address the physician shortage in NC, that would have required a very different report (and a different set of skills than I possess). Instead, the purpose of the research was to explore the potential impact—good, bad, or otherwise—of less restrictive APRN regulation.
    - And the scope of research was to include an economic impact analysis similar to one that already had been conducted by The Perryman Group in Texas. The report's section II--titled The Policy Problem: The Untapped Potential of APRNs—simply observed that many outside experts had concluded there was a physician shortage, so that it was logical to consider expanded use of APRNs as one (but clearly not the only) solution to that problem.
    - I am comfortable that the steering committee was well-suited for the task at hand. My apologies if the manner in which I constructed my remarks may have led anyone to think that the report's central focus was on how to address the state's physician shortage.

7. **NCNA Support**. Along the same lines, at least one comment was made about our study being supported by NCNA.
    - As a research professor, I am not in a position to undertake large-scale research studies such as this without financial support (nor is a doctoral student such as Robert Richards expected to provide hundreds of hours of research uncompensated).

- My training at the Pardee RAND Graduate School taught me how to do even-handed impartial policy analysis, to follow the evidence, if you will. Consequently, in our report, we have bent over backwards to show anyone who reads it how we conducted the analysis and what assumptions we made (and essentially given them the tools to tweak those assumptions, methods or sources to arrive at their own analytic conclusions).
- Put another way, my work effort is for sale; my opinion is not. Had the NC General Assembly or any physicians' group underwritten this research, they would have received the identical report with the identical conclusions. However, instead it was the NCNA which inquired about our ability and availability to conduct this research. We said yes.
- It's worth noting that our conclusions regarding APRNs and quality--as well as the potential of APRNs to address the nation's physician shortage--mirror those of the Federal Trade Commission and national Institute of Medicine. This helped reinforce my belief that our own synthesis of evidence regarding quality and our primary analysis of the potential of APRNs to address the physician shortage were done in a balanced fashion without any significant errors or omissions.
- Along the same lines, it is worth noting that our economic impact analysis has been published in a peer-reviewed journal: Economic Benefits of Less Restrictive Regulation of APRNs in North Carolina. *Nursing Outlook* 63(5), September-October 2015.[6] This journal uses double-blind review, which means that both the reviewer and author name(s) are not allowed to be revealed to one another for a manuscript under review.[7] The identities of the authors are concealed from the reviewers, and vice versa. This rigorous method of securing unbiased professional review of our analysis should provide further reassurance to the committee that our work was conducted in accordance with the highest professional standards.
- Along the same lines, this research was undertaken because it had not been done previously; neither the Duke team nor NCNA knew ex ante what the results of our research would be. As with all Duke sponsored research agreements, article 9 expressly states "Duke shall be free to use the results of the subject research for its own teaching, research, clinical and publication purposes." I fully expected this research to produce at least one academic publication and fully intended to publish my results regardless of whether NCNA might have viewed that to be in their own best interest. Such is the inherently risky nature of academic policy research.
- Thus, we welcome any constructive criticism of our report, its source or methods, but casting aspersions on our integrity seems neither fair nor appropriate.

Please do not hesitate to ask if there is any additional information your committee needs from me.

Best wishes,

Christopher J. Conover, Ph.D.
Research Scholar

[6] Abstract available at: http://www.nursingoutlook.org/article/S0029-6554(15)00180-3/abstract.
[7] The journal's peer review policy is explained here: http://www.nursingoutlook.org/content/authorinfo.