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Trends in Global Surgeon, Anesthesiologist, and Obstetrician Physician Ratios

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Introduction: Inadequate access to surgical and anesthesia care is one of the greatest global health crises, affecting over 5 billion people, with 9/10 people in low-income (LIC) and lower-middle income (L-MIC) countries unable to access safe essential and emergency surgery. A large contributing factor to this crisis is inadequate workforce, quantified by the Surgeon, Anesthesiologist and Obstetrician (SAO) workforce density (specialist physicians/100,000 population). Based on the correlation of SAO density and maternal mortality ratio (MMR), in 2015 the Lancet commission on Global Surgery recommended a minimum of 20 SAO physicians per 100,000 population in LICs. A study of anesthesia providers identified that at least 4 (of the 20/100,000) should be physician anesthesiologists to decrease MMR. Little is known about the current ratio of Surgeons, Anesthesiologists, and Obstetricians in different populations/ demographics, and how this may impact infant and maternal mortality rates.

Methods: Numbers of practicing surgeons, anesthesiologists, and obstetricians were collected from a convenience sample of publicly available medial licensing registries for 2018 or 2019. Countries' MMR, infant mortality rates (IMR) and birth rates for the same year were compared to their specific specialist/total SAO ratio. Spearman's correlation was performed to compare continuous variables. Kruskal-Wallis equality-of-population rank test was used to compare continuous variables between income categories. Statistical analysis was performed using STATA.

Results: We found population, birth rates, mortality rates and numbers of Surgeon, Anesthesia and Obstetric physician providers for 20 countries across all 6 WHO regions with data from 3 LIC, 3L-MIC, 7 Upper-middle income (UMIC) and 7 High income (HIC) countries. Ratios of each specific specialist type to total SAO was similar between countries. For Surgeons: Mean = 0.5295, median = 0.5297, Std = 0.0926. For Anesthesiologists: Mean = 0.2236, Median = 0.2101, Std: 0.1127, For Obstetricians Mean = 0.2467, Median = 0.2331, Std = 0.0813 (Figure 1). Adjusted to 20providers/100,00 population we find 10.59 (9.73-11.5), 4.47 (3.42-5.53), 4.93 (4.17-5.70) Surgeons, Anesthesiologists and Obstetricians (with 95% confidence intervals) would be needed to meet to 2030 Lancet goal at current ratios. Ratios of specific provider types to total SAO numbers were highly conserved across income groups, with no differences between income groups (Kruskal-Wallis p-values of 0.550, 0.562, 0.166 for Surgeon, Anesthesiologist, and Obstetricians respectively). Fraction of total SAO physicians made up by Obstetricians was significantly correlated with birth rate (Spearman's rho: 0.56, p-value: 0.01) though not with MMR or IMR. Ratios of surgeons/SAO and of anesthesiologists/SAO were not significantly correlated to MMR or IMR.

Conclusions: In order to meet the Lancet 2030 goal of 20 SAO providers/100,000 population we have found the ratio of 10.5 Surgeons: 4.5 Anesthesiologists: 5 Obstetricians to be consistent across countries and income brackets, and may guide NSOAP planning or directed funding for specialty training to address local deficiencies. While this recommendation is consistent with the recommended 4 Anesthesiologists/100,000 population, this ratio likely requires adjustment in the proportion of Obstetricians based on local birth rate.

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