

## Methodology

### Delaware Health Force Team

The Delaware Health Force (DHF) team imports data on licensed healthcare providers and institutions in Delaware. This data is collected under a data use agreement established with the Delaware Division of Professional Regulation and comes from their DELPROS system.

Once the data import for the license types of interest is complete, analysts prepare the data following these steps:

1. Data scrubbing is undertaken to normalize the data, and to catch variation in, for instance, how a person's name is listed, or degree information is recorded.
2. Duplicates are removed or merged. Duplicates can occur within the data for a variety of reasons, and they are merged into a single record after record by record review.
3. Addresses are prepared geocoding. This may involve editing typos, correcting street directionals, replacing PO boxes with physical addresses, and making similar corrections to maximize the accuracy of the automated geocoding process.
4. Address data is geocoded. Providers' county, ZIP code, census tract, and other geofenced areas are identified as needed.

## Counting Providers and Facilities

DELPROS data gives us a total count of the licensed providers within a given profession, and is further delineated into Active, Cancelled, Closed, Expired, and "Other" status categories.

**Providers with out-of-state practice addresses.** Within each profession, some share of licensees report out-of-state practice addresses. Often, but not always, these addresses are in states that border Delaware: Maryland, New Jersey, and Pennsylvania. Some providers with out-of-state addresses may in fact be practicing in Delaware. Some providers treat patients via telehealth; others may practice in Delaware for part of the year; still others may work in Delaware as well as a border state. Currently, there is no way to know with certainty how many providers with out-of-state addresses are actually treating patients in Delaware. This is an enhancement planned for the future.

**Providers with no clearly identified practice address.** In its present form, DELPROS allows new and renewing applicants to list addresses without defining their attribute. As a result an address may be home, office, institution, main office, branch location, etc. Similarly, some smaller share of licensees report no practice address at all. Often this is because they are no longer practicing. A future enhancement based upon the USPS "Residential Delivery Indicator" (RDI) will be employed to verify addresses, validate addresses, standardize addresses, and provide both RDI and Delivery Point Validation (DPV). Two such applications are the API Tool SmartyStreet and Lob.

When considering the broad range of disciplines that the entire caregiver team encompasses, we realize that at any point in time some number of licensed professionals of all types may be in administration and not seeing patients in any capacity. Others may be un- or underemployed at any point in time as well. At this time, there is no effective way to differentiate and isolate them

from the larger workforce, and so a margin of error is implied. Further study will be necessary to determine what that margin of error is in arithmetic terms. Facilities provide their own challenges in counting including whether or not that are actually open for business, have closed to never be reopened, or are newly licensed but not yet seeing clients.

### Normalizing Self-Reported Specialty and Subspecialty

How physicians self-categorize their specialty practice is subject to the vagaries of natural language input. For this report, we have chosen to use the Association of American Medical College’s Specialty Pathway architecture shown on the following two pages. While imperfect as some speciality / subspecialty destinations can be achieved via various pathways, this does provide us with a consistent framework.

### Normalizing Self-Reported Educational Level

Similar to self-reported specialty and subspecialty, there are numerous self-reported terms referring to what year of education a physician is in. This is compounded by the date of the data in question as what month of the year the data is being viewed from as internships and residency start dates do not follow the calendar year. Further more, the length of residency varies by specialty. We utilized the Accreditation Council for Graduate Medicine Education pipeline matrix, shown in table 1, to adjust for these significant differences. It should be further noted that not all residency types are offered at Delaware locations.

Table 1. Accreditation Council for Graduate Medicine Education Pipeline Specialty Matrix <sup>1</sup>

Three Years	Internal Medicine Medical Genetics and Genomics Osteopathic Neuromusculoskeletal Medicine (up to 5 years) Pediatrics Preventive Medicine
Three to Four Years (depending on program)	Emergency Medicine Family Medicine Neurology Pathology (anatomic and clinical)
Four Years	Anesthesiology Internal Medicine-Pediatrics Nuclear Medicine Obstetrics and Gynecology Ophthalmology Dermatology Psychiatry
Five Years	Child Neurology Diagnostic Radiology Orthopaedic Surgery Otolaryngology – Head and Neck Surgery Radiation Oncology General Surgery Urology

	Vascular Surgery
Six Years	Plastic Surgery – Integrated Interventional Radiology (up to 7 years, depending on the program) Thoracic Surgery (up to 7 years, depending on the program)
Seven Years	Neurological Surgery

## Future Enhancements

In the near future, this data will be cross-referenced against the NPI Registry in the Delaware Health Force system. The NPI Registry is a service of the US Centers for Medicare and Medicaid Services, which, in many cases, provides additional information not captured within the DELPROS system. Information is also imported from the Delaware Health Information Network for those professionals who have both a Delaware license and an NPI number to further refine data on active practitioners.

## References

1. Murphy, B. (2020, Nov 19). Medical specialty choice: Should residency training length matter? American Medical Association. Retrieved from: <https://www.ama-assn.org/residents-students/specialty-profiles/medical-specialty-choice-should-residency-training-length>

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