

# Maine’s Physician, Nurse Practitioner, and Physician Assistant Workforce in 2018

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## KEY FINDINGS

This report uses two sources of data to describe Maine’s 2018 physician, nurse practitioner (NP), and physician assistant (PA) workforce supply: Maine health professions license data and the American Medical Association Physician Masterfile. These findings were compared to those from a 2014 report using the same data sources, and also provides county-level comparisons of workforce supply with population health rankings from the Robert Wood Johnson Foundation’s County Health Rankings. This report provides a starting point for discussions of the state’s needs for additional workforce development and/or deployment. Key findings include:

- Compared with 2014, Maine had slightly fewer licensed physicians, and more NPs and PAs in Maine for every 100,000 state residents in 2018.
- Mean ages of physicians were the same, but NPs’ and PAs’ mean ages each decreased by one year from 2014 to 2018.
- Maine’s practicing physician supply, on a per capita basis, was somewhat larger than national averages, both overall and for primary care.
- The number of primary care physicians per capita varied greatly by county, with more than twice as many in counties with the highest physician density compared with counties having the lowest density.
- Half or more of the physicians in many of Maine’s most rural counties were age 55 or older.
- Nearly a quarter of Maine’s total 2018 practicing physician supply graduated from medical school at one of the three colleges affiliated with Maine Medical Center.
- About 27% of all of Maine’s physicians in 2018 – 42% of primary care physicians, and more than half in family medicine specialties – completed a residency in Maine, which is an overall increase from 2014.
- Comparisons of county-level physician, NP and PA workforce supply with indicators of population health show some areas of the state where the availability of providers may be affecting access to healthcare, suggesting areas for further examination.

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## INTRODUCTION

Having enough healthcare providers in the right places and with the needed backgrounds and specialties to meet the growing and changing healthcare demand is a shared goal of states across the U.S. Information about a state's health workforce supply and distribution is a critical resource for healthcare planning and policy development. This brief offers information on the size and distribution of Maine's physician, nurse practitioner (NP), and physician assistant (PA) workforce, addressing the questions:

- How many physicians, NPs, and PAs are licensed in Maine?
- How are physicians, NPs, and PAs distributed across the state?
- How many physicians, NPs, and PAs are in Maine relative to the size of the population?
- How many physicians, by specialty, practice in Maine?
- What are the demographic characteristics of Maine's practicing physicians?
- What proportion of Maine's physician workforce graduated from the key medical schools with state affiliations?
- What proportion of Maine's physician workforce completed an in-state residency?
- How have the above factors changed since 2014?

This brief uses two main sources of data to describe Maine's physician, NP, and PA workforce supply. First, using health professions license data from the Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing, which were the only available statewide sources of data on NP and PA supply, we compared the number and distribution of these three occupations across the state. While using license data allows for basic comparisons of the supply of physicians, NPs, and PAs, these data are quite limited; for example, the sex of NPs is not available from the license records. A second, more detailed source of data about the physician supply is available from the American Medical Association (AMA) Physician Masterfile, which we use to provide more in-depth description of the supply, distribution, education history, specialty, and other characteristics of physicians involved in direct patient care in Maine (see **Appendix: Methods**). Data collected for this report were compared to findings from the same data sources as reported in our earlier report "Maine's physician, nurse practitioner, and physician assistant workforce in 2014."<sup>1</sup>

Using different sources of data to describe Maine's physician workforce results in slightly different estimates of their size and distribution. Because state license data do not distinguish between providers who are actively providing direct patient care and those who hold a license but are primarily involved in other activities (e.g., teaching, research, administration) or who practice out of state, the estimates of physician supply (as well as for other occupations) derived from a state's license records are typically higher than estimates that can distinguish physicians providing direct patient care, such as derived from the AMA Masterfile. As well, the data used by the AMA for the Physician Masterfile come from several sources and from a different timeframe than the very recent data we accessed from Maine's physician license file. By using these available data on Maine's physician, NP, and PA workforce, however, this report provides a reasonable starting point for discussions of the state's needs for additional workforce development and/or deployment.

Merely knowing the numbers of providers in a community is not enough to determine if a population has adequate access to needed care. Health insurance coverage and social determinants of health also have significant impact on access. To provide a more complete perspective on the populations addressed by this report, we also compare physician, NP, and PA workforce supply findings with estimates of county-level population health from the Robert Wood Johnson Foundation's County Health

Rankings.<sup>2</sup> These rankings of counties within a state are based on population health factors and health outcomes (derived from available data such as from the Centers for Disease Control). There is not necessarily a direct correlation between population health measures and provider supply, but illustrating how these measures relate to each other may suggest areas where further study and action is needed.

## PHYSICIANS, NPs, AND PAs LICENSED IN MAINE

Analyses based on Maine health professions license data

### TOTAL NUMBER, AGE, AND SEX

The number of physicians, NPs, and PAs with an active Maine license, as well as the number of providers in each category with a mailing address in Maine, is shown in **Table 1**. Sixty-eight percent of physicians (allopathic [MDs] and osteopathic [DOs]) with Maine licenses had in-state addresses compared with 84% of NPs and 94% of PAs.

For consistency with previous estimates and because older providers often have limited practices, subsequent analyses using license data did not include providers age 75 years or older (fewer than 4% of any of the provider types). **Table 2** shows that the number of NPs and PAs with license addresses in Maine increased (by 24% and 17%, respectively) between 2014 and 2018, while the number of physicians decreased slightly (by 2%). While physicians' mean age stayed the same, the mean age of NPs and PAs decreased slightly between 2014 and 2018. Among licensed providers in 2018, 44% of physicians and 25% of PAs were age 55 or older, an increase of 0.8% for physicians and 0.7% for PAs compared to 2014. The percentage of NPs age 55 to 74 decreased by 2.4 percentage points to 39% in 2018.

**Table 1.**  
All physicians, NPs, and PAs with Maine licenses in 2018

Licensed providers	#	Licensed providers with addresses in Maine	
		#	% in state
Physicians	6,187*	4,201	67.9%
NPs	1,695	1,420	83.8%
PAs	772**	724	93.8%

\*Includes 5,112 allopathic (MD) and 1,075 osteopathic (DO) physicians

\*\*Includes 711 allopathic and 61 osteopathic PAs

Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing

**Table 2.**

Demographic characteristics of licensed physicians, NPs and PAs with a Maine mailing address, 2018 compared to 2014

Licensed Providers with Maine addresses	2018				2014				Percent Change			
	Total	Mean age (years)	Percent age 55 to 74	Percent female	Total	Mean age (years)	Percent age 55 to 74	Percent female	Total	Mean age (years)	Percent age 55 to 74	Percent female
Physicians*	4,039	52	43.8%	36.6%	4,130	52	43.0%	NA	-2.2%	-0.3%	1.9%	NA
NPs	1,417	49	38.9%	NA	1,146	50	41.3%	NA	23.6%	-1.8%	-5.8%	NA
PAs**	723	44	24.9%	58.9%	619	45	24.2%	56.3%	16.8%	-2.3%	2.9%	4.6%

Excludes 10 physicians and 5 PAs with an unknown mailing address. Also excludes 162 physicians, 1 PA and 3 NPs age 75 or older.

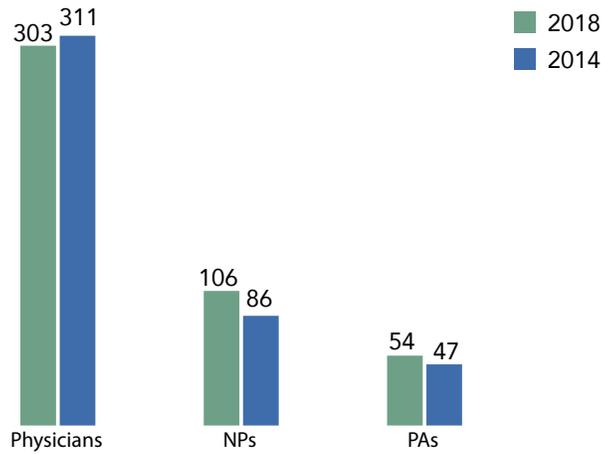
Sex not available from licensing records for physicians and NPs in 2014 or from NPs in 2018.

\*Includes 3,415 allopathic (MD) and 715 osteopathic (DO) physicians (2014); 3,252 allopathic and 787 osteopathic physicians (2018)

\*\*Includes 619 allopathic and 0 osteopathic PAs (2014); 662 allopathic and 61 osteopathic PAs (2018)

Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing

**Figure 1: Number of licensed physicians, NPs, and PAs\* per 100,000 population in Maine, 2018 compared to 2014**



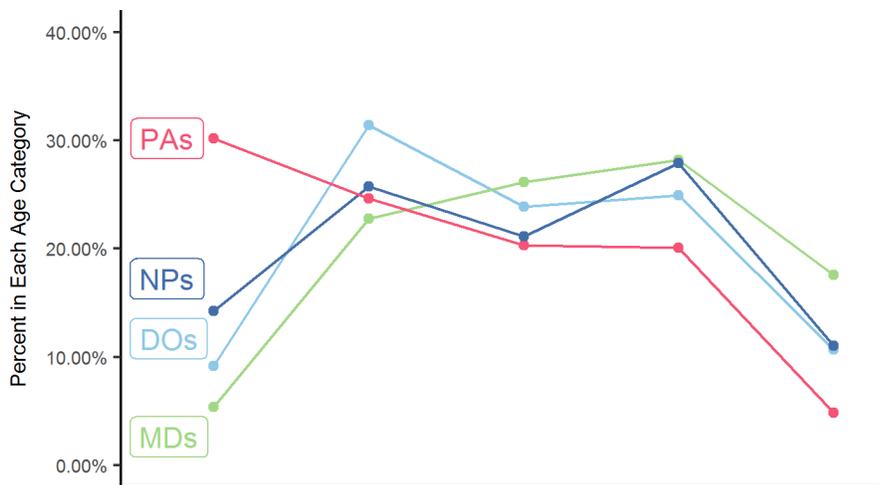
\*Age <75 with license addresses in Maine.

Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing

**Table 2** and **Figure 1** show that the number of physicians with Maine license addresses decreased from 2014 to 2018 in absolute numbers and physicians per 100,000 population. This was driven primarily by a decrease in MDs from 3,415 in 2014 to 3,252 in 2018. The number of licensed DOs, NPs, and PAs with a Maine mailing address increased during this time period.

**Figure 2** illustrates that in 2018 Maine's PA, osteopathic physician (DO) and NP workforces were comprised of somewhat larger proportions of younger (age 44 or less) individuals compared to allopathic physicians (MDs). Overall, 55% of PAs, 40% of NPs, 40% of DOs and 28% of MDs were age 44 or younger.

**Figure 2: Percent of licensed PAs, NPs, DOs, and MDs with a Maine mailing address in each age category (2018)\***

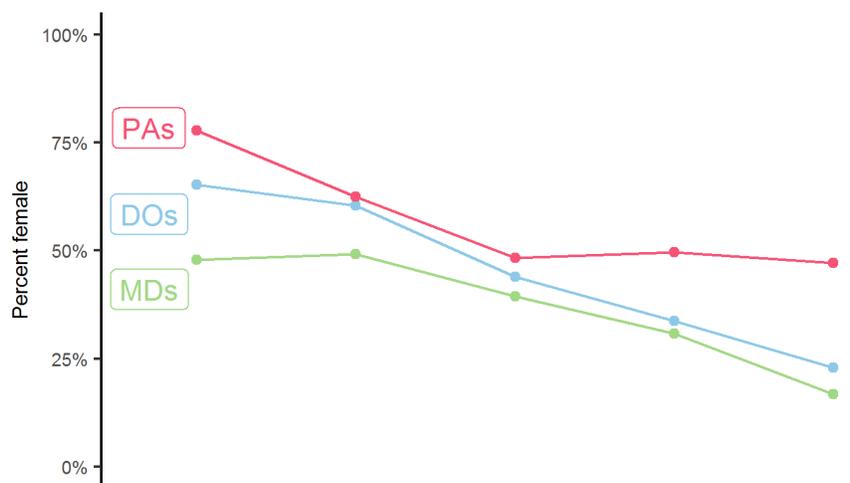


	23-34	35-44	45-54	55-64	65-74
<b>PAs</b>	30.2%	24.6%	20.3%	20.1%	4.8%
<b>NPs</b>	14.3%	25.8%	21.1%	27.9%	11.0%
<b>DOs</b>	9.1%	31.4%	23.9%	24.9%	10.7%
<b>MDs</b>	5.4%	22.8%	26.1%	28.2%	17.6%

\*Excludes providers age 75 and older

Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing

**Figure 3: Percent of licensed PAs, DOs and MDs with a Maine mailing address who are female, by age category\* (2018)**



	23-34	35-44	45-54	55-64	65-74
<b>PAs</b>	77.7%	62.4%	48.3%	49.6%	47.1%
<b>DOs</b>	65.2%	60.4%	43.9%	33.7%	22.9%
<b>MDs</b>	47.9%	49.2%	39.5%	30.8%	16.8%

\* Number and percent of providers with missing sex across all age categories: 8 DOs (0.7%), 171 MDs (3.3%), 28 PAs (3.6%). Sex was not available from NP license data.  
Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing

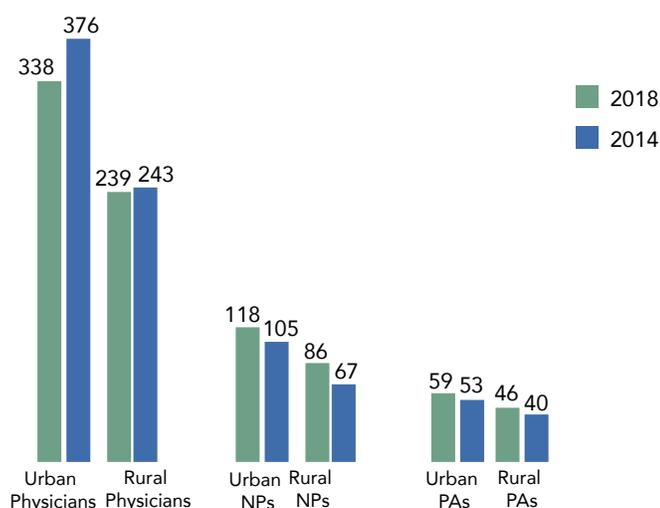
In 2018, 37% of physicians and 59% of PAs were female (sex was not available from NP licensing data) (Table 2). Figure 3 shows that the percentage of females for these provider groups was higher in younger age groups. For example, 48% of MDs in the 23-34 age group were female compared to 17% of MDs in the 65-74 age group.

### DISTRIBUTION

#### Rural-urban distribution

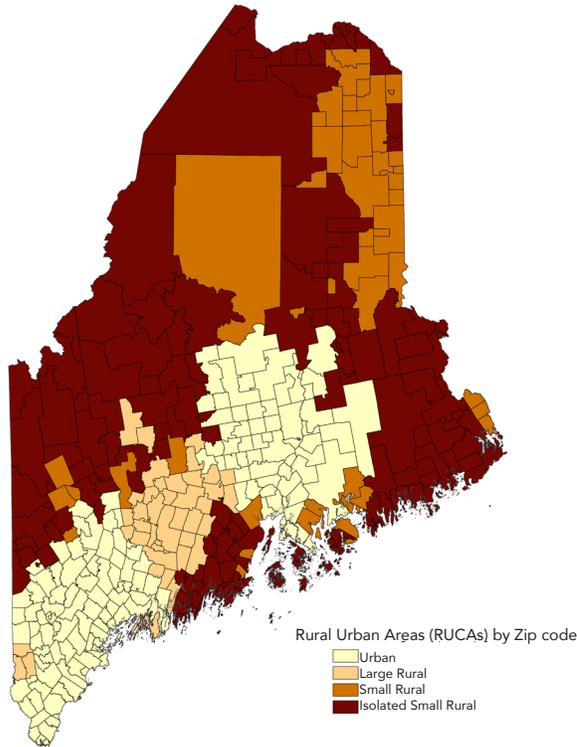
There were fewer licensed physicians, NPs and PAs per 100,000 population in rural compared with urban areas of Maine in 2014 and 2018 (Figure 4). Urban areas experienced a larger decrease over time than rural areas. NPs and PAs per 100,000 population increased from 2014 to 2018, with larger increases over time in rural areas.

**Figure 4: Urban and rural distribution of Maine’s licensed physicians, NPs, and PAs per 100,000 population, 2018 compared to 2014**



\*Age <75 with license addresses in Maine.  
Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing

**Figure 5: Location of urban and rural areas in Maine in 2018**



Data Sources: Rural-Urban Commuting Area (RUCA) Codes File Version 3.10

**Figure 5** illustrates urban and rural areas in Maine, as defined by Rural-Urban Commuting Areas (RUCAs)<sup>3</sup> (see **Appendix: Methods**). Among sub-rural areas, the per capita numbers were similar for each provider type in large rural and small rural areas, but were much lower in isolated small rural areas of Maine in 2018 (**Table 3**). This pattern is similar to the one observed in 2014.<sup>1</sup>

**Table 3.**

Rural-urban distribution\* and number per 100,000 population of licensed physicians, NPs, and PAs in Maine in 2018

Licensed providers* **	Urban Maine		Overall Rural Maine		Sub-Rural Areas of Maine					
	#	#/100,000 population	#	#/100,000 population	Large Rural		Small Rural		Isolated Small Rural	
					#	#/100,000 population	#	#/100,000 population	#	#/100,000 population
Physicians	2,923	338.0	1,116	238.5	475	283.1	380	316.9	261	144.8
NPs	1,017	117.6	400	85.5	153	91.2	110	91.7	137	76.0
PAs	510	59.0	213	45.5	100	59.6	69	57.5	44	24.4

\*Rural-urban determined using ZIP code RUCA taxonomy. Overall rural is a combination of the three sub-rural categories.

\*\*Age <75 with license addresses in Maine.

Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing, Rural-Urban Commuting Area (RUCA) Codes File Version 3.10

## Distribution by county

The distribution of physicians, NPs and PAs throughout Maine varied greatly by county in 2018. Generally, the largest numbers were in urban counties (Cumberland, Penobscot, and Kennebec) and the fewest were in Piscataquis, Sagadahoc and Washington counties (Table 4 and Figure 6). Looking at the number of providers per 100,000 population reveals some notable patterns. For example, York County has a high absolute number of physicians, NPs and PAs compared to other counties, but a relatively lower number of providers per 100,000 population. Piscataquis County shows the opposite pattern, with a low number of providers but a relatively higher number per 100,000 population. Oxford County has the lowest number of providers of all types per 100,000 population. Finally, Sagadahoc and Waldo counties are in the lower half of counties in physicians per 100,000 population, but are in the top half of counties for NPs per 100,000 population. It is important to remember that geographic assignments based on licensing data use the licensee’s mailing address, and may not represent a provider’s practice locations nor capture their practice status. Additionally, there is no consensus about the “ideal” rate of providers per 100,000 population, and the numbers per population presented in this report are best considered as starting points for examining the adequacy of the workforce supply.

**Table 4.**  
County distribution and number per 100,000 population: physicians, NPs, and PAs licensed in Maine\* in 2018

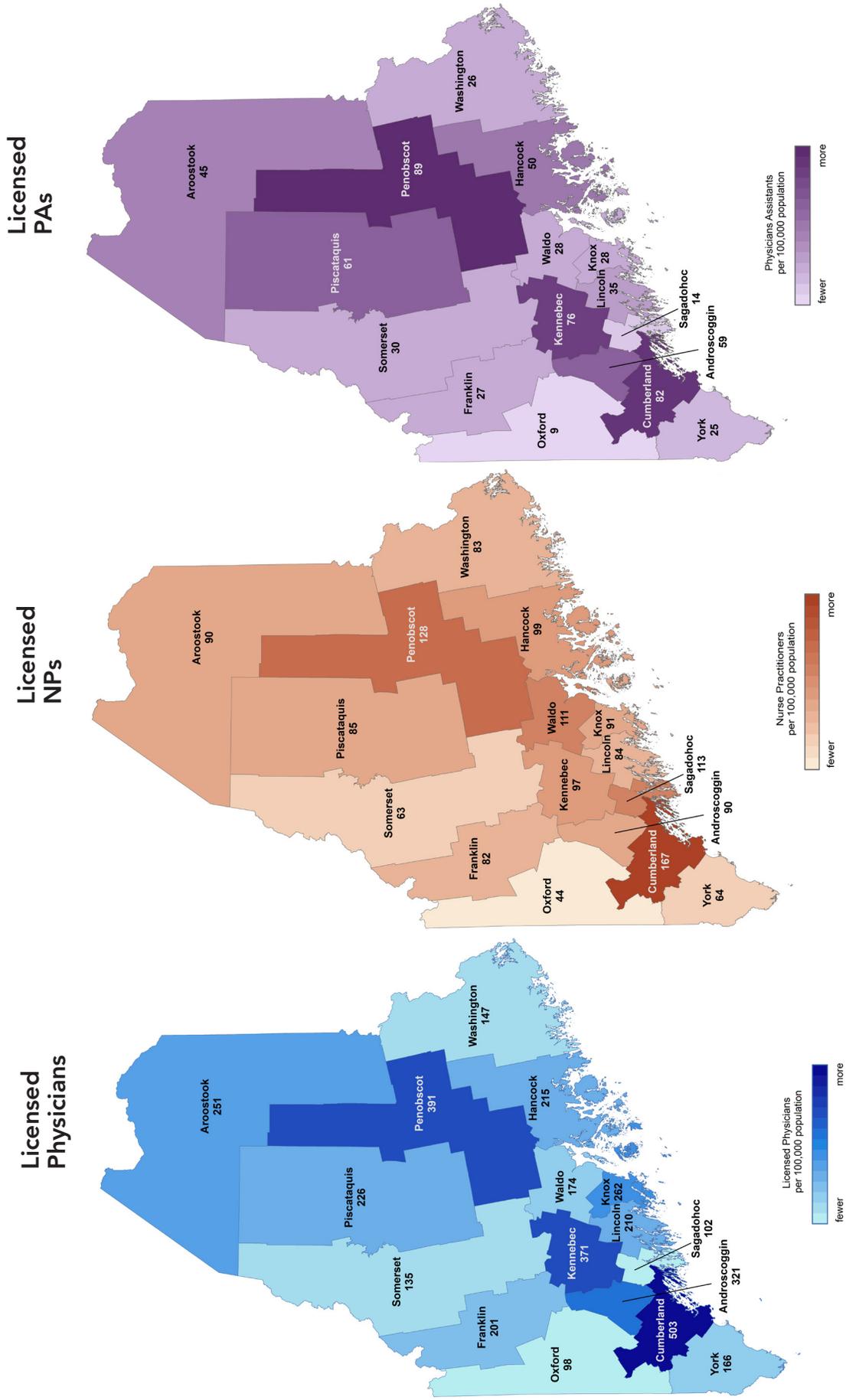
County	Licensed Physicians**		Licensed NPs		Licensed PAs		Physicians** + NPs + PAs	
	# in 2018	#/100,000 population	# in 2018	#/100,000 population	# in 2018	#/100,000 population	# in 2018	#/100,000 population
Androscoggin	344	320.6	96	89.5	63	58.7	503	468.8
Aroostook	167	251.3	60	90.3	30	45.2	257	386.8
Cumberland	1,485	503.2	494	167.4	241	81.7	2,220	752.2
Franklin	59	201.1	24	81.8	8	27.3	91	310.2
Hancock	113	215.1	52	99.0	26	49.5	191	363.7
Kennebec	446	370.7	117	97.2	91	75.6	654	543.6
Knox	104	261.9	36	90.7	11	27.7	151	380.3
Lincoln	72	209.6	29	84.4	12	34.9	113	329.0
Oxford	56	97.8	25	43.6	5	8.7	86	150.1
Penobscot	599	390.5	197	128.4	137	89.3	933	608.3
Piscataquis	37	225.6	14	85.4	10	61.0	61	372.0
Sagadahoc	36	101.9	40	113.2	5	14.2	81	229.3
Somerset	68	134.6	32	63.4	15	29.7	115	227.7
Waldo	69	174.2	44	111.1	11	27.8	124	313.0
Washington	46	146.6	26	82.9	8	25.5	80	254.9
York	338	166.0	131	64.3	50	24.5	519	254.8

\*Age <75 with license addresses in Maine.

\*\*Includes allopathic and osteopathic physicians

Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing

Figure 6. Number of licensed physicians, NPs, and PAs\* per 100,000 population in Maine in 2018



Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing

## Age by county

While the age at which health care providers retire is difficult to predict, understanding the locations where large proportions of the workforce are nearing retirement age can help inform workforce planning. In nine of Maine’s 16 counties, 50% or more of physicians were 55 or older; in two, 50% or more of NPs were 55 or older; and in three, 50% or more of PAs were age 55 or older in 2018 (Table 5). By contrast, Androscoggin, Penobscot, and Cumberland had some of the youngest physician, NP, and PA workforces.

**Table 5.**

Percent of licensed physicians, NPs, and PAs age 55 or older by county in Maine in 2018

County	Percent of licensed providers age 55 or older*		
	Physicians**	NPs	PAs
Androscoggin	39.5%	27.1%	14.3%
Aroostook	50.9%	45.0%	36.7%
Cumberland	39.8%	33.2%	20.7%
Franklin	52.5%	41.7%	25.0%
Hancock	65.5%	50.0%	53.8%
Kennebec	48.2%	43.6%	29.7%
Knox	57.7%	47.2%	54.5%
Lincoln	58.3%	44.8%	25.0%
Oxford	42.9%	24.0%	80.0%
Penobscot	35.4%	42.6%	24.1%
Piscataquis	54.1%	57.1%	30.0%
Sagadahoc	50.0%	42.5%	20.0%
Somerset	42.6%	43.8%	26.7%
Waldo	66.7%	47.7%	45.5%
Washington	60.9%	46.2%	37.5%
York	46.4%	42.0%	10.0%

\*Among provider age <75 with license addresses in Maine.

\*\*Includes allopathic and osteopathic physicians

Data Sources: Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing

# PHYSICIANS, PROVIDING DIRECT PATIENT CARE

Analyses based on data from the American Medical Association Physician Masterfile

## NUMBER OF PHYSICIANS OVERALL AND BY SPECIALTY

Analyses using data from the American Medical Association (AMA) Physician Masterfile provided information about the specialty, demographic characteristics, and medical education history of the estimated 3,867 physicians (96% of the physicians identified through professional license data, as shown in **Table 2**) who provided direct patient care in Maine in 2018 (**Table 6**). Because some licensed providers do not provide direct patient care, the practicing supply is expected to be smaller than the licensed supply. Both the total estimated number of physicians and the number per 100,000 population were larger in 2018 than were found in 2014.

Primary care physicians (1,469 in family medicine, general internal medicine, and general pediatrics) represent 38% of Maine's 3,867 total practicing physicians (**Table 6**). Statewide, a majority of primary care (55%) were family medicine physicians. All physician specialties in Maine, except obstetrics/gynecology, experienced slight increases per 100,000 population in 2018 compared with 2014.

**Table 6.**

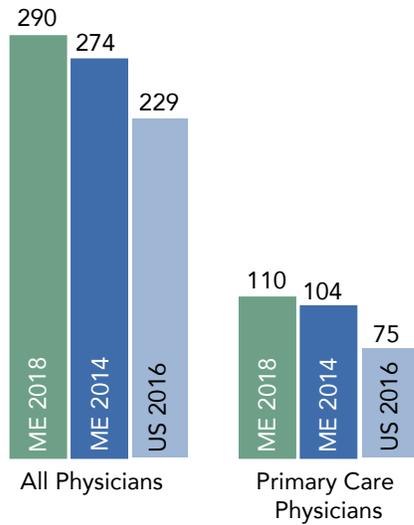
Number of physicians in Maine, overall and by specialty, in 2018 and 2014

Physicians providing direct patient care*	# 2018	# 2018/100,000 population	# 2014	# 2014/100,000 population
<b>Total</b>	3,867	290.2	3,637	273.6
<b>Primary care</b>				
Family Medicine	814	61.1	766	57.6
General Internal Medicine	446	33.5	416	31.3
General Pediatrics	209	15.7	200	15.1
<b>Specialists</b>				
General Surgery	138	10.4	128	9.6
Obstetrics-gynecology	157	11.8	163	12.3
Other Surgery	119	8.9	107	8.1
Psychiatrists	239	17.9	221	16.6
Other Specialists	1,745	130.9	1,636	123.1

\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed.

Data Source: AMA Physician Masterfile

**Figure 7. Maine compared with national estimates of physicians\* per 100,000 population**



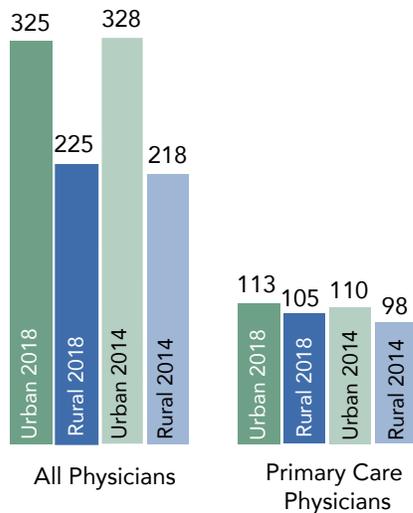
\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed.  
Data Source: AMA Physician Masterfile

Estimates of Maine’s per capita practicing physician supply were higher than estimates of the national supply (**Figure 7**). In 2018, there were an estimated 290 physicians providing direct patient care per 100,000 population in Maine. The closest comparable estimate available for the U.S. was from 2016 and showed 229 physicians providing direct patient care per 100,000 U.S. population.<sup>4</sup> In 2018, Maine’s estimated number of primary care physicians per 100,000 population was 110, which was higher than the 2014 estimate of 104. Maine still appears to have higher primary care physician supply than the nation overall. Of course, a national average is not an indication of “the right number” of healthcare professionals, but provides a point of comparison for subsequent examinations of related access measures.

### PHYSICIAN DISTRIBUTION

Fewer physicians provided direct patient care per 100,000 population in rural compared with urban areas of Maine, although there was more rural-urban parity among practicing primary care physicians (**Figure 8**). This figure also shows that the number of practicing physicians per capita in urban areas decreased slightly between 2014 and 2018, while primary care physicians per capita increased slightly in both urban and rural areas between 2014 and 2018.

**Figure 8. Maine physicians\* in urban and rural areas (total and primary care specialties) per 100,000 population in 2018 and 2014**



\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed.  
Data Source: AMA Physician Masterfile

**Table 7.**  
Maine physicians in urban, rural, and sub-rural areas in 2018

Physicians providing direct patient care*	Urban Maine		Overall Rural Maine		Sub-Rural Areas of Maine					
					Large Rural		Small Rural		Isolated Small Rural	
	#	#/100,000 population	#	#/100,000 population	#	#/100,000 population	#	#/100,000 population	#	#/100,000 population
<b>Total</b>	2,812	325.2	1,055	225.5	446	265.8	361	301.0	248	137.6
<b>Primary Care</b>	976	112.9	493	105.4	197	117.4	165	137.6	131	72.7
Family Medicine	495	57.2	319	68.2	139	82.8	92	76.7	88	48.8
General Internal Medicine	326	37.7	120	25.6	40	23.8	45	37.5	35	19.4
General Pediatrics	155	17.9	54	11.5	18	10.7	28	23.4	8	4.4
<b>Specialists</b>										
General Surgery	101	11.7	37	7.9	9	5.4	19	15.8	9	5.0
Obstetrics-gynecology	113	13.1	44	9.4	13	7.7	21	17.5	10	5.5
Other Surgery	96	11.1	23	4.9	10	6.0	9	7.5	4	2.2
Psychiatrists	184	21.3	55	11.8	28	16.7	17	14.2	10	5.5
Other Specialists	1,342	155.2	403	86.1	189	112.6	130	108.4	84	46.6

\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed.  
Data Source: AMA Physician Masterfile

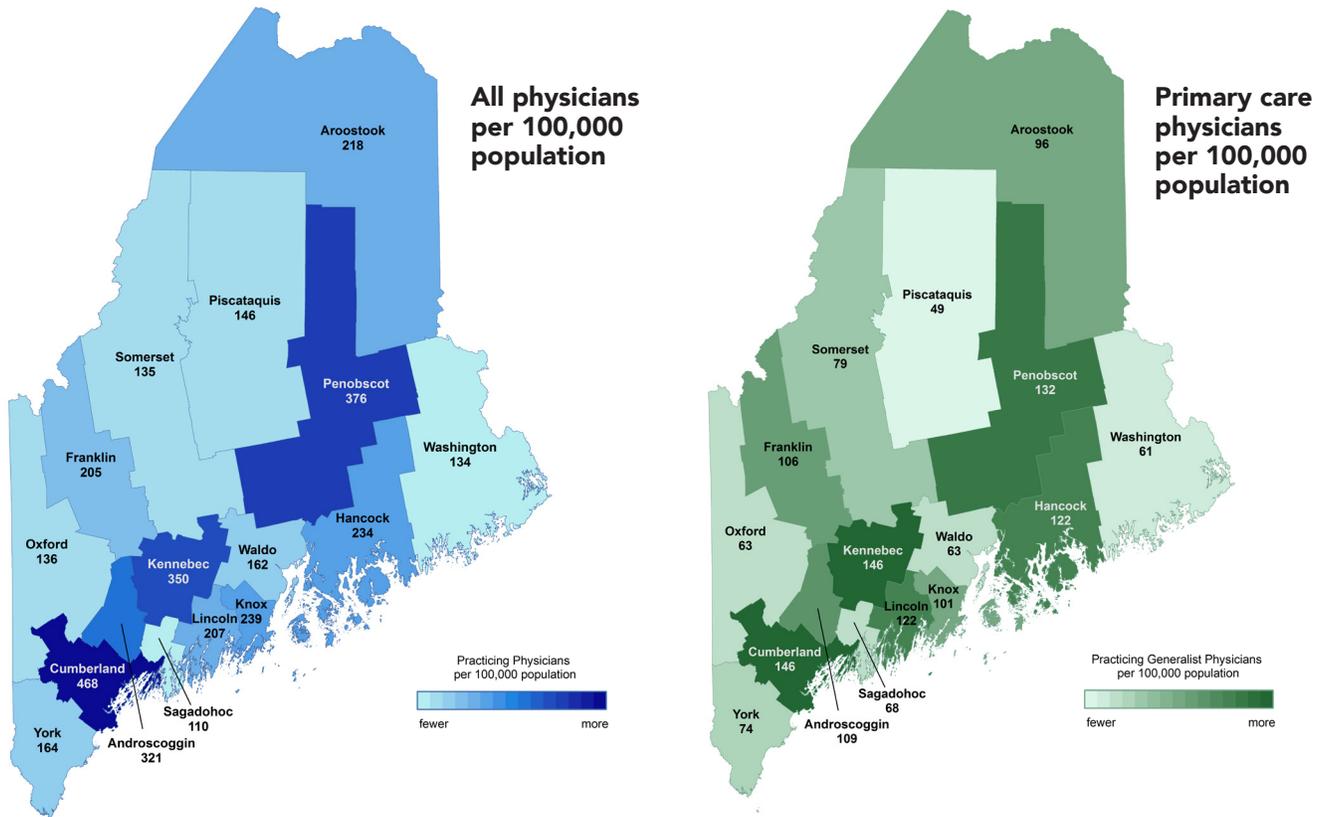
**Table 7** details the rural-urban distribution of the state’s physicians, overall and by specialty, and shows their distribution among three sub-rural area types: large rural, small rural and isolated small rural. While specialists generally congregate in urban areas where more specialty care services and larger hospitals are located, primary care physicians practiced somewhat more evenly across Maine’s urban and rural areas, although isolated small rural areas showed more sparse supply numbers.

The per capita ratios of physicians providing direct patient care per 100,000 population varied greatly by county, from a high of 468 total practicing physicians per 100,000 population in Cumberland county to 110 in Sagadahoc, and from 146 practicing primary care physicians per 100,000 population in Kennebec county and Cumberland county to 49 in Piscataquis (**Figure 9**). These numbers, derived from the AMA Physician Masterfile and reflecting estimates of physicians providing direct patient care by practice location, appear reasonably comparable to the number of licensed physicians per capita shown in **Figure 6** based on physician license data.

## PHYSICIAN AGE AND SEX

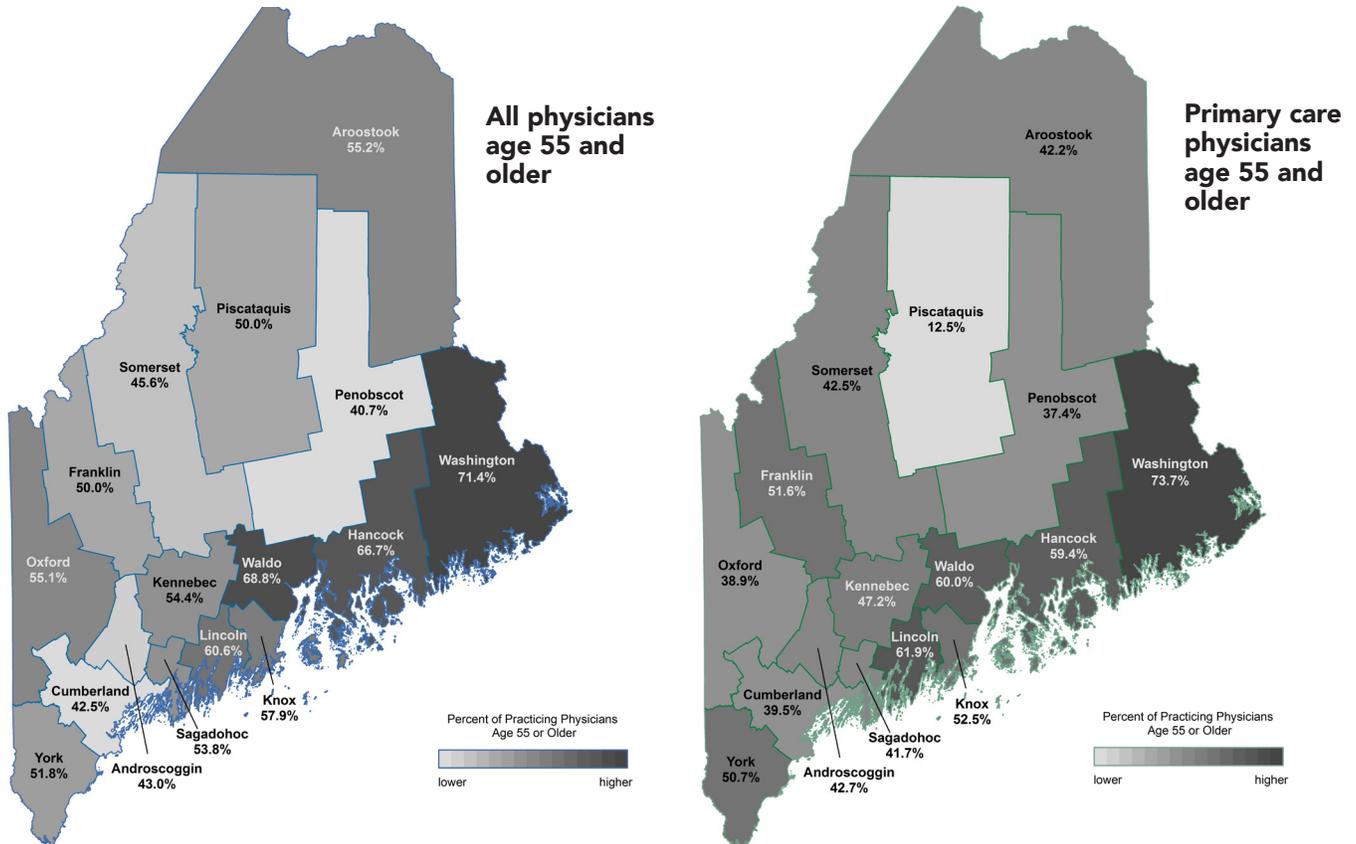
Many of Maine’s rural counties had high percentages of physicians age 55 and older (e.g., Washington, Hancock, Waldo and Lincoln) (**Figure 10**). More than half of all practicing physicians in ten of Maine’s 16 counties were age 55 or older in 2018. Our findings also show that in seven counties half or more of the primary care physicians were age 55 or older.

Figure 9. Maine physicians\* per 100,000 population in 2018, by county



\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed. Data Source: AMA Physician Masterfile

Figure 10. Maine physicians\* age 55 or older in 2018, by county



\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed. Data Source: AMA Physician Masterfile

**Table 8.**  
Percent female among physicians in Maine, by age group, in 2018 and 2014

Physicians providing direct patient care*	<35 yrs.		35-44 yrs.		45-54 yrs.		55-64 yrs.		65-74 yrs.		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
<b>Total 2014</b>	64	50.8%	406	47.0%	390	37.9%	297	26.0%	63	13.2%	1,220	34.0%
<b>Total 2018</b>	76	56.3%	442	51.4%	409	39.8%	401	34.3%	130	19.3%	1,458	37.7%

\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed.  
Data Source: AMA Physician Masterfile

Overall, 38% of Maine’s physicians providing direct patient care in 2018 were female compared with 34% in 2014. Higher percentages of Maine’s younger cohorts of practicing physicians were female in both 2018 and 2014 (Table 8). Among physicians aged 35 or younger, 57% were female in 2018 compared with 51% in 2014. Likewise, among physicians aged between 35 and 44 years old more than half were female in 2018, compared to 47% in 2014.

## PHYSICIAN EDUCATION AND TRAINING

The top five medical schools from which Maine’s 2018 physician workforce graduated are shown in Table 9. The highest percentage graduated from the University of New England College of Osteopathic Medicine (11%) followed by the University of Vermont College of Medicine (7.3%) and Tufts University School of Medicine (4.2%). The top five schools are the same as reported in 2014.

**Table 9.**

Top 5 medical schools from which Maine’s physicians\* graduated in 2018

Medical School	State	# of physicians	% of Maine’s physicians graduating from school
University of New England College of Osteopathic Medicine	ME	416	10.8
University of Vermont College of Medicine	VT	284	7.3
Tufts University School of Medicine	MA	161	4.2
Dartmouth Medical School	NH	111	2.9
University of Massachusetts Medical School	MA	109	2.8

\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed.  
Data Source: AMA Physician Masterfile

**Table 10.**

Top states where Maine physicians\* completed a residency in 2018 and 2014

Residency State	2018		2014	
	#	% of Maine’s physicians completing a residency in the state**	#	% of Maine’s physicians completing a residency in the state**
<b>ME</b>	952	26.6%	855	25.3%
<b>MA</b>	439	12.3%	416	12.3%
<b>NY</b>	384	10.7%	394	11.7%
<b>PA</b>	249	7.0%	250	7.4%
<b>CA</b>	104	2.9%	106	3.1%
<b>CT</b>	102	2.9%		

\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed.  
\*\*Percentages are calculated based on physicians for whom residency state data were available. 263 cases (7.2%) were missing state.  
Data Source: AMA Physician Masterfile

About 27% of Maine's 2018 practicing physician workforce completed a residency in Maine, followed by Massachusetts, New York, Pennsylvania, California, and Connecticut (**Table 10**). Nearly 62% of Maine's practicing physician workforce completed a residency in one of these 6 states. These were the same top states (with the exception of Connecticut) where Maine's physicians were found to have completed residencies in 2014, and nearly 100 more were identified in 2018 as having completed a residency in Maine.

More than a quarter (27%) of Maine's overall practicing primary care physician supply in 2018 graduated from one of the three medical schools that have been affiliated with Maine Medical Center over the past several decades. These include the University of New England College of Medicine (affiliated from 1978-present), Tufts (affiliated prior to 1980 and 2009-present), or the University of Vermont (affiliated from about 1980-2009) (**Table 11**). Thirty percent of physicians in family medicine specialties graduated from one of these three schools.

**Table 11.**

Maine's physicians in 2018 compared with 2014 who graduated from a medical school in or near Maine and/or completed a residency in Maine

Physicians providing direct patient care*	Graduated from affiliated medical schools**			Completed a residency in Maine***			Graduated from affiliated medical school* and completed a residency in Maine***		
	#	%	% change from 2014 to 2018	#	%	% change from 2014 to 2018	#	%	% change from 2014*** to 2018
<b>Total</b>	861	22.3%	0.6%	952	26.6%	1.3%	307	8.6%	0.4%
<b>Primary Care</b>	404	27.5%	0.2%	573	42.1%	1.3%	195	14.3%	-0.1%
Family Medicine	241	29.6%	-0.2%	410	56.3%	0.9%	133	18.3%	-0.2%
General Internal Medicine	95	21.3%	-0.3%	104	24.2%	2.0%	37	8.6%	-0.2%
General Pediatrics	68	32.5%	3.0%	59	29.2%	0.8%	25	12.4%	0.7%
<b>Specialists</b>									
General Surgery	19	13.8%	-1.0%	22	16.7%	-2.0%	1	0.8%	-1.6%
Obstetrics-gynecology	40	25.5%	3.4%	42	28.0%	1.1%	14	9.3%	1.6%
Other Surgery	15	12.6%	-0.5%	2	1.8%	-2.1%	0	0.0%	0.0%
Psychiatrists	46	19.2%	2.5%	73	31.7%	3.0%	21	9.1%	1.7%
Other Specialist	337	19.3%	0.6%	240	15.0%	1.7%	76	4.8%	0.9%

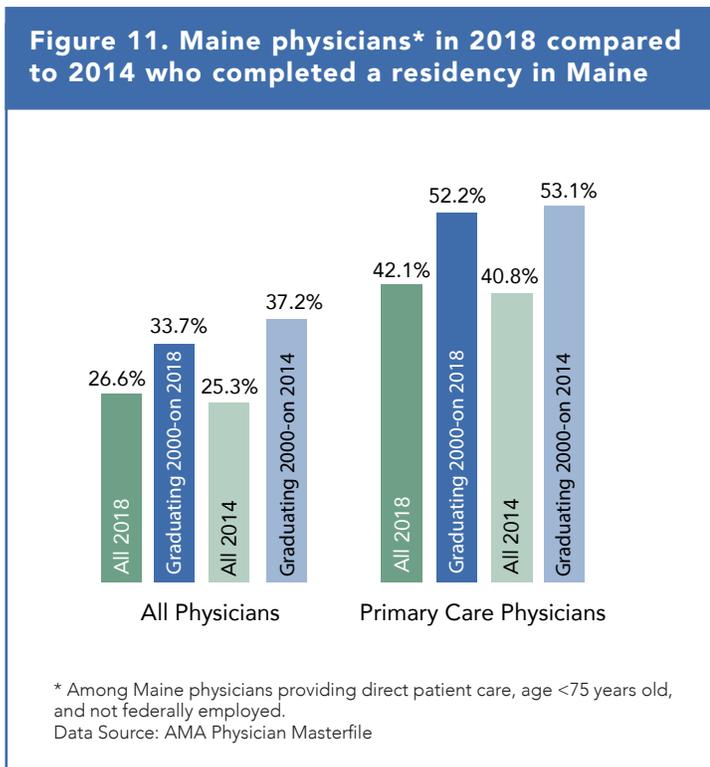
\* Among Maine physicians providing direct patient care, age <75 years old, and not federally employed.

\*\*Colleges affiliated with Maine Medical Center: University of New England College of Medicine (UNECOM), Tufts, or the University of Vermont. UNECOM (affiliated from 1978-present), Tufts (affiliated prior to 1980 and 2009-present), or the University of Vermont (affiliated from about 1980-2009).

\*\*\*Percentages are based on physicians for whom residency state data were available. There were 284 physicians for whom state of residency completion was missing and 0 were missing medical school.

Data Source: AMA Physician Masterfile

Slightly more than a quarter of Maine’s overall practicing physicians in 2018, 42% of all primary care physicians, and more than half (56%) of physicians in family medicine specialty completed a residency in Maine. Just 9% both graduated from one of the three affiliated medical schools and completed a residency in Maine. Among primary care physicians in 2018 these percentages were higher: 27% graduated from one of the affiliated medical schools, 42% completed a residency in-state, and just 14% did both. A higher percentage of physicians who graduated from medical school since 2000 completed residencies in Maine (**Figure 11**).



## COMPARISON OF WORK-FORCE SUPPLY WITH POPULATION HEALTH MEASURES

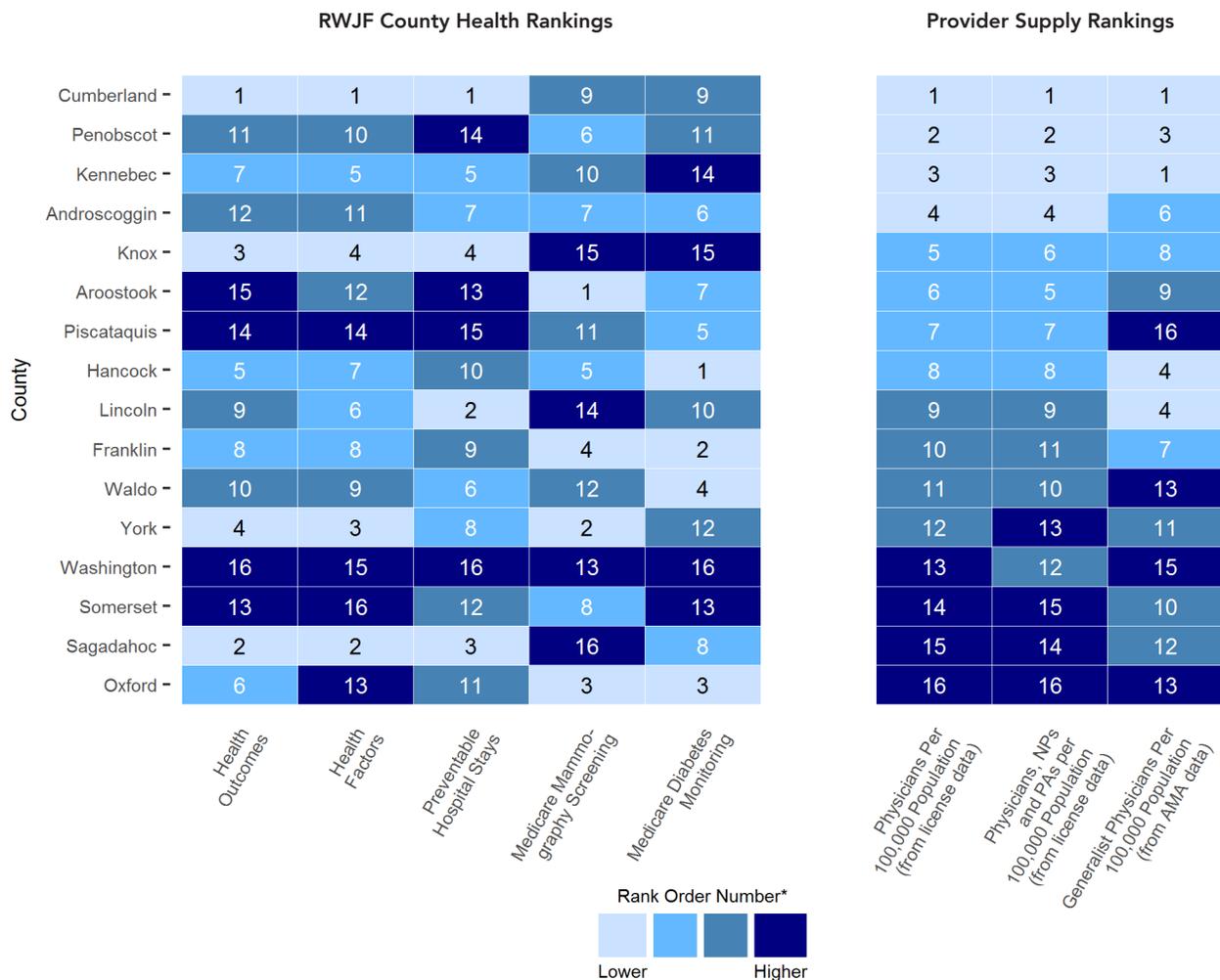
The Robert Wood Johnson Foundation (RWJF) County Health Rankings and Roadmaps uses available data on population health factors and health outcomes to create county rankings within each state.<sup>2</sup> These rankings are derived from data from a variety of national sources and include measures of health outcomes (length of life, and measures of quality of life such as incidence of low birthweight and self-reported health status) and health factors (health behaviors, clinical care, social, and economic factors, and physical environment). We compared Maine’s physician, NP, and PA workforce supply findings with the RWJF county health rankings for the combined health outcomes measure, the combined measure for health factors, and for the specific measures related to preventable hospital stays, percent of

Medicare enrollees that receive recommended mammography screening and percent of eligible of Medicare enrollees that receive appropriate diabetes monitoring (**Figure 12**).

There is not a clear overall relationship between the number of providers per 100,000 population and the summary health outcomes and health factors rankings. At the highest and the lowest rankings, however, there is some congruence: Cumberland county is ranked highest in per capita provider supply and has the highest ranking in health outcomes, health factors and preventable hospital stays, while Washington and Somerset counties are among the lowest ranked counties for provider supply and also has some of the lowest rankings across population health measures. It is possible that multiple associations could play a role in these results. For example, having more providers may be associated with delivering more of the healthcare services needed by a population, and/or more providers may be attracted to counties with healthier populations, and providers may be less easily recruited to counties with less healthy populations.

While the data for the RWJF county rankings is the most recent available to the developers, some of the data components contributing to the measures may be several years old and therefore these findings should be interpreted as suggestive and not conclusive. In addition, rankings are simply relational measures and a ranking of 1 doesn’t necessarily indicate “great” status, nor does a high number indicate “bad” status. Nonetheless, while there is not necessarily a direct correlation between population health rankings and provider supply, these comparisons may suggest areas where further study and possible action is needed.

**Figure 12. Rank\* of Maine counties for licensed providers per 100,000 population in 2018 and selected county health measures†**



\*Lower rankings indicate better performance. Ties received the same rank  
 †Based on Robert Wood Johnson Foundation County Health Rankings and Roadmaps<sup>2</sup>

## SUMMARY

Based on comparisons of provider licenses in 2014, Maine had slightly fewer licensed physicians, and more NPs and PAs in Maine for every 100,000 state residents in 2018. The mean age of Maine’s licensed physicians, 52 years, was the same as in 2014, but NPs’ and PAs’ mean ages each decreased by one year from 2014 to 2018. Rural areas of Maine had fewer physicians, NPs and PAs per capita compared with urban areas. The lowest numbers of providers per capita were in Oxford, Sagadahoc, and Somerset counties.

More detailed data obtained from the AMA Physician Masterfile indicated that Maine’s practicing physician supply, on a per capita basis, was somewhat larger than national averages, both overall and for primary care. Primary care physicians represented 38% of Maine’s total 3,867 practicing physicians. While more total physicians were found to practice in urban

areas, statewide there were similar numbers of primary care physicians per capita in large and small rural areas, although much smaller numbers in isolated small rural areas, compared with urban areas of Maine. The number of primary care physicians per capita varied greatly by county, with more than twice as many in counties with the highest physician density (Cumberland, Penobscot, and Kennebec) compared with counties having the lowest density (Piscataquis, Washington, Waldo, and Oxford). Half or more of the physicians in many of Maine's most rural counties were age 55 or older, indicating the potential for retirements to create gaps in future supply.

Nearly a quarter of Maine's total practicing physician supply graduated from medical school at one of the three colleges affiliated with Maine Medical Center: University of New England College of Medicine, Tufts, and the University of Vermont. About 27% of all of Maine's physicians, 42% of primary care physicians, and more than half in family medicine specialties completed a residency in Maine. Residency is known to be highly associated with the location where a physician eventually chooses to practice and of the population he or she prefers to serve, and is therefore a useful recruitment tool.<sup>5</sup> In 2016, Maine had a 50% retention rate (1,050 active physicians who completed a residency in Maine were practicing in-state from among the 2,088 nationwide who had completed a residency in Maine), and ranked 12th among states for retaining physicians who completed a residency in-state.<sup>6</sup> The state appears to be increasingly successful in retaining physicians through in-state residencies. Higher percentages of Maine physicians who graduated from medical school in 2000 or later completed a residency in-state compared to the overall physician workforce, and the overall numbers of Maine's physicians who completed a residency in state increased from 2014 to 2018.

While the workforce supply data presented in this report indicate that Maine has a strong supply of physicians, NPs, and PAs, indicators of population health in some parts of the state raise questions that this paper cannot address. Comparing county-level physician, NP, and PA workforce supply with indicators of population health showed that there are some areas of the state where the availability of providers is likely affecting access to healthcare. More careful examination of the community-level factors that may be influencing, or influenced by, these associations are merited in order to develop and support healthy communities throughout Maine.

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## APPENDIX: METHODS

The data for licensed physicians, NPs, and PAs were obtained from the Maine Board of Licensure in Medicine, the Maine Board of Osteopathic Licensure, and the Maine State Board of Nursing in February and March, 2018. Only records with an active license status were included. Temporary, emergency, educational, emeritus, consultive, administrative, volunteer, and non-clinical licensed were excluded. For most analyses involving license data, results were limited to licenses with a Maine mailing address based on the state or ZIP Code provided by the licensee.

The data for analyses of physicians providing direct patient care came from the American Medical Association (AMA) Physician Masterfile, accessed in January, 2018. There were 4,841 total allopathic and osteopathic physicians with Maine license records in the AMA dataset. Those selected for these analyses were the 3,867 with 1) an in-state practice address (or mail address, when practice was not available), 2) who were age 74 or younger, 3) provided direct patient care, and 4) were not a federal employee. Physicians were assigned specialties using the AMA dataset's "primary" and "secondary" specialty fields. The primary specialty was reassigned to the secondary specialty for about 6% of physicians when there was indication from the listed secondary specialty that the physician was likely to practice more specialized medicine than the primary specialty indicated. Physician specialties were grouped into primary care (family medicine, general internal medicine, and general pediatrics specialties) and specialists (general surgery, obstetrics-gynecology, other surgery, psychiatrists, and other specialists).

State population data came from a custom-prepared file of selected 2018 population data with ZIP codes cross-referenced to counties.<sup>7</sup> Provider ZIP codes were linked to the Rural Urban Commuting Area (RUCA) Codes File, Version 3.10.<sup>3</sup> RUCA codes classify ZIP codes into 33 categories according to core population and work commuter flow patterns. RUCA codes were used to designate each ZIP Code as follows: Urban=1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1; Large Rural=4.0, 4.2, 5.0, 5.2, 6.0, and 6.1; Small Rural=7.0, 7.2, 7.3, 7.4, 8.0, 8.2, 8.3, 8.4, 9.0, 9.1, and 9.2; Isolated Small Rural=10.0, 10.2, 10.3, 10.4, 10.5, and 10.6. Several of the provider ZIP codes from the AMA Masterfile and 2018 license data had not been created by the U.S. Postal Service when the RUCA file was created in 2014. These new ZIP codes were for PO Boxes or small residential areas that were surrounded by larger areas that did have a RUCA designation. We assigned the RUCA code of the larger surrounding area to these newer ZIP Code areas.

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