

Wisconsin Council on Medical Education & Workforce

2021 Healthcare Workforce Report

The Future of Wisconsin's Healthcare Workforce



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INTRODUCTION AND ACKNOWLEDGEMENTS

This report was generated by the Wisconsin Council on Medical Education and Workforce (WCMEW). WCMEW is a collaborative of stakeholders in Wisconsin's health care workforce that includes representation from a broad range of organizations. Organizations continue to provide critical input around data needs, policy opportunities, and workforce collaborations. WCMEW Council members include:

- Marshfield Clinic Health System
- Pharmacy Society of Wisconsin
- Rural Wisconsin Health Cooperative
- State of Wisconsin
- University of Wisconsin School of Medicine and Public Health
- Wisconsin Academy of Physician Assistants
- Wisconsin Area Health Education Centers (AHEC)
- Wisconsin Center for Nursing
- Wisconsin Hospital Association
- Wisconsin Medical Society
- Wisconsin Nurses Association

WCMEW's mission is to ensure a strong healthcare workforce for Wisconsin citizens, now and in the future.

In 2020, the WCMEW Council requested that Executive Director George Quinn study what key segments of Wisconsin's healthcare workforce might look like in the year 2035 and make appropriate recommendations resulting from the analysis and findings. To help guide the study WCMEW enlisted the help of the Task Force on Care Delivery. We would like to acknowledge members of the Council and the Task Force on Care Delivery for their insights and guidance during this project.

BACKGROUND

The goal of this report is to take more comprehensive look at Wisconsin's healthcare workforce. It is the first from WCMEW to include physicians, physician assistants, pharmacists, and nursing professionals.

The rationale for a broader approach is that healthcare is increasingly delivered by teams of physicians, nurses, physician assistants, and pharmacists. An expansive perspective should provide a clearer picture of the adequacy of the resources required to serve Wisconsin citizens in the future, more so than focusing on a single profession.

The objectives of this report are to:

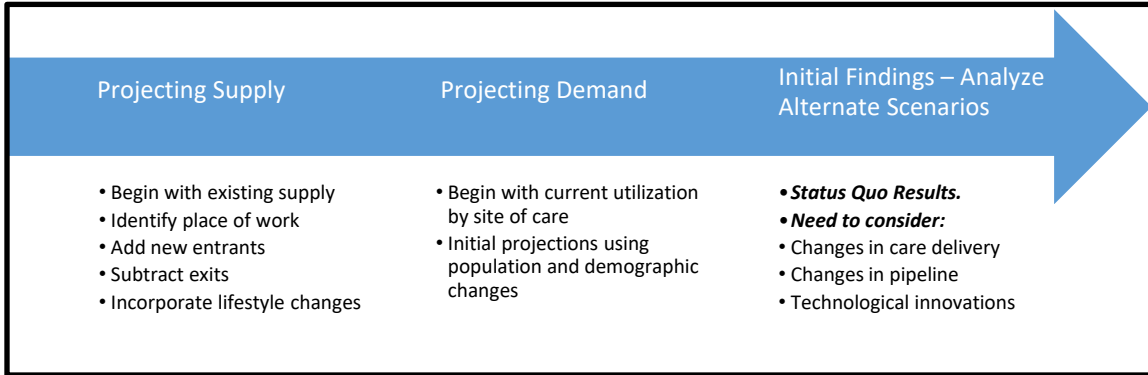
1. Understand the total numbers of professionals and their distribution across the state of Wisconsin.
2. Develop a comprehensive model for forecasting supply and demand for all Advanced Practice Clinicians.
3. Analyze scenarios that address potential changes in healthcare in Wisconsin.
4. Report on the findings of the project, together with policy recommendations.

MODELING APPROACH AND DATA

The questions posed below form the conceptual basis for the study. The questions include quantitative supply/demand issues and inquire about healthcare might change in the future. In addition, we address how current issues like the COVID pandemic could change our thinking about the future of care delivery.

<p>Workforce questions</p> <ul style="list-style-type: none">✓ Based on population and demographics, what will the demand for clinical services look like in 15 years? How do we prepare to meet that need?✓ Are the providers distributed effectively across WI to ensure access?✓ Do we have providers in the right disciplines?✓ What are some potential changes in healthcare delivery?✓ Are there enough resources to train tomorrow's providers – at both schools and clinical sites?✓ Does state public policy support maximum, high-quality utilization of providers, based on their education and training?✓ What might be the impact of changes in technology✓ What have we learned from the COVID experience?
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The diagram below provides an overview of the study method. It includes measures of utilization, population and demographics, practice sites, and education and training pipelines for professions.



The basic construct of the **status quo model** includes the following components and assumptions:

1. Population and demographics drive utilization
2. All services and practice sites (place of work) classified into a limited number of categories
3. Each profession's FTEs are apportioned/attributed to defined practice sites
4. All utilization is apportioned/attributed to service types
5. Education and training pipelines are identified for each profession and remain constant
6. Existing staffing/workforce practices remain the same

Our data sources are detailed in Appendix A.

THE IMPORTANCE OF CHANGES IN POPULATION AND DEMOGRAPHICS

Before providing the model status quo results, it is important to note the impact that changes in population – and more importantly changes in demographics – are likely to have on healthcare utilization. In general, the over-65 age cohorts utilize 3 to 4 times as much healthcare as the younger population (as shown in the tables that follow). And since the population totals in those same cohorts are projected to increase at a much greater rate than the younger groups, their impact on healthcare utilization will be disproportionate.

The table below shows the current and projected population for Wisconsin by age group and gender.

Age Group	Male			Female		
	2020	2035	% Change	2020	2035	% Change
0-19	772,770	806,085	4%	735,770	769,320	5%
20-44	950,905	978,740	3%	915,060	930,970	2%
45-64	783,095	752,460	-4%	783,550	730,060	-7%
65-74	304,185	348,010	14%	320,845	365,835	14%
75+	180,845	347,245	92%	258,055	447,545	73%
All	2,993,820	3,234,575	8%	3,015,300	3,245,765	8%

Data obtained from the Wisconsin Department of Administration

Note that while the overall population is projected to increase by 8% from 2020 to 2035, the over-65 population is projected to increase at much greater rates. Also note that the 20 to 64 cohorts are projected to remain somewhat stagnant, which will have its own impact on both supply and utilization.

The 20 to 44 age cohort, from which much of the new entrants into professions originates. Since the growth in this category is somewhat flat, it will likely limit the growth the healthcare labor force.

Each of these factors will impact on projected changes in healthcare utilization and workforce.

The potential long-term impact of the current pandemic on the number of applicants seeking a career in healthcare as well as those leaving healthcare is not yet known; see discussion later in this report.

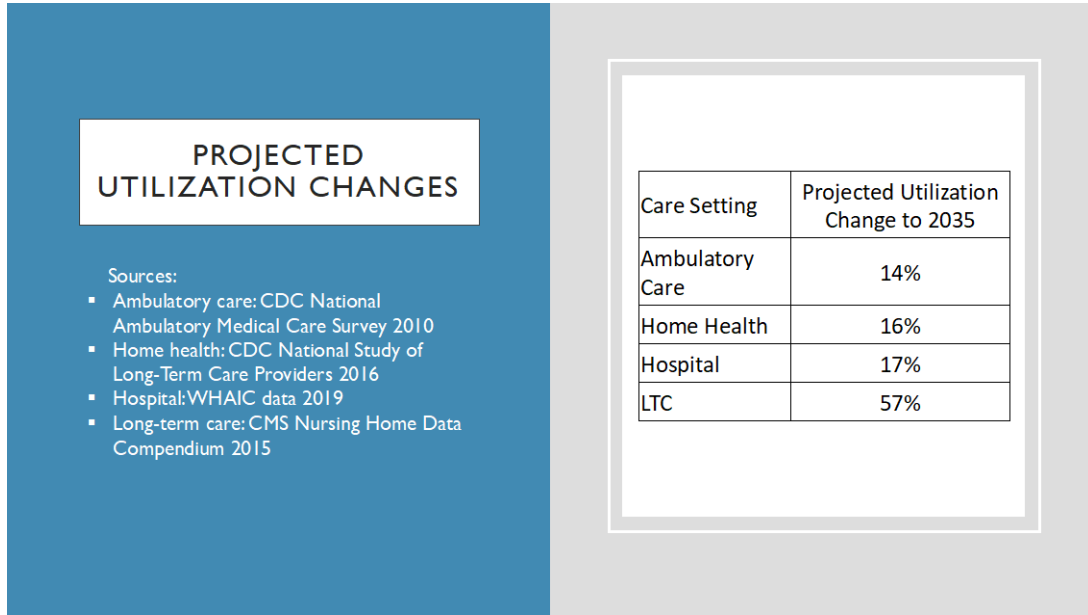
CURRENT AND PROJECTED UTILIZATION BY SERVICE TYPE

For our analysis, all healthcare services are classified into one of four categories:

- Ambulatory care
- Home health
- Hospital
- Long-term care

The rationale for this classification scheme is that it is found in a number of sources that report on healthcare utilization by population. In addition, it is used in reports on healthcare professions sites of care (or places of work). Therefore, it was used as a method for projecting both changes in utilization and resulting demand for each of the professions.

A summary of the results is shown below. Details can be found in Appendix B.



While each of the care settings show double-digit increases, long-term care is projected to increase by 57%, which results from the dramatic increase in the population over the age of 65. Note: It has been much noted during the pandemic that a shortage of staff in long term care not only impacts that sector but also the ability of hospitals to transfer patients to LTC.

PROJECTED WORKFORCE SUPPLY

Workforce supply was projected using the following factors:

- The number of new entrants was calculated using 90% of the latest 5-year annual average of newly licensed practitioners from DSPS and projecting forward to 2035. We used 90% of the recent trend due to the nearly flat projected population change in the 20-to-44 age category over the next 15 years. In the past 15 years, it has increase by 10%.
- Attrition and reduced number of patients seen for professionals past the age of 55.
- The “lifestyle change” impact, assuming the same decrease in the number of patients seen by profession in the recent past.
- We assumed that net immigration and out-migration would remain constant

SURPLUS OR DEFICIT

We compared projected supply with projected demand. The following chart provides a summary:

	Registered Nurses	Licensed Practical Nurses	Advanced Practice Nurse Prescribers	Pharmacists	Physician Assistants	Primary Care Physicians	Medical Specialties	Surgical Specialties	Other Physicians	All Physicians	Totals
Supply											
2020 Supply (1)	60,822	10,409	6,671	5,907	2,695	4,687	3,777	3,130	2,593	14,187	100,691
New entrants, 2020-2035 (2)	36,539	6,253	7,565	3,270	2,474	2,561	2,091	1,863	513	7,029	63,129
Attrition, 2020-2035 (3)	{37,115}	{8,306}	{4,069}	{1,890}	{1,195}	{2,109}	{1,473}	{1,443}	{804}	{5,829}	{58,404}
Change in work patterns (4)	{3,602}	{617}	{527}	{340}	{191}	{522}	{422}	{360}	{224}	{1,528}	{6,804}
Projected supply, 2035	56,644	7,740	9,640	6,947	3,783	4,617	3,972	3,191	2,079	13,859	98,613
Total Change, 2020-2035	{4,178}	{2,669}	2,969	1,040	1,088	{70}	195	61	{514}	{328}	{2,078}
% change, 2020-2035	-7%	-26%	45%	18%	40%	-1%	5%	2%	-20%	-2%	-2%
Demand											
2020 Demand	60,822	10,409	6,671	5,907	2,695	4,787	3,870	3,130	2,593	14,379	100,883
Projected demand, 2035	72,575	14,099	7,809	6,933	3,120	5,706	4,841	3,537	2,927	17,011	121,547
Total change, 2020-2035	11,753	3,690	1,138	1,026	425	919	971	407	334	2,632	20,664
% change, 2020-2035	19%	35%	17%	17%	16%	19%	25%	13%	13%	18%	20%
Adequacy of Supply, 2035											
Total Projected Supply minus Demand	{15,931}	{6,359}	1,831	14	663	{1,088}	{869}	{346}	{849}	{3,152}	{22,935}

- (1) Licensed professionals as of June 30, 2020. FTEs in direct patient care calculated for each profession. Definition for each profession shown in appendix C.
- (2) New entrants using 90% of the latest five-year trend projected to 2035.
- (3) Retirements and other attrition. Retirement age assumed to be 70.
- (4) Using recent trends (see appendix C).

Detailed calculations for each profession can be found in Appendix C.

INITIAL THOUGHTS AND FURTHER ANALYSIS

Referring to the summary table, we see projected deficits in supply for registered nurses, licensed practical nurses, and all physician specialties, while surpluses are projected for advanced practical nurses, physician assistants, and pharmacists.

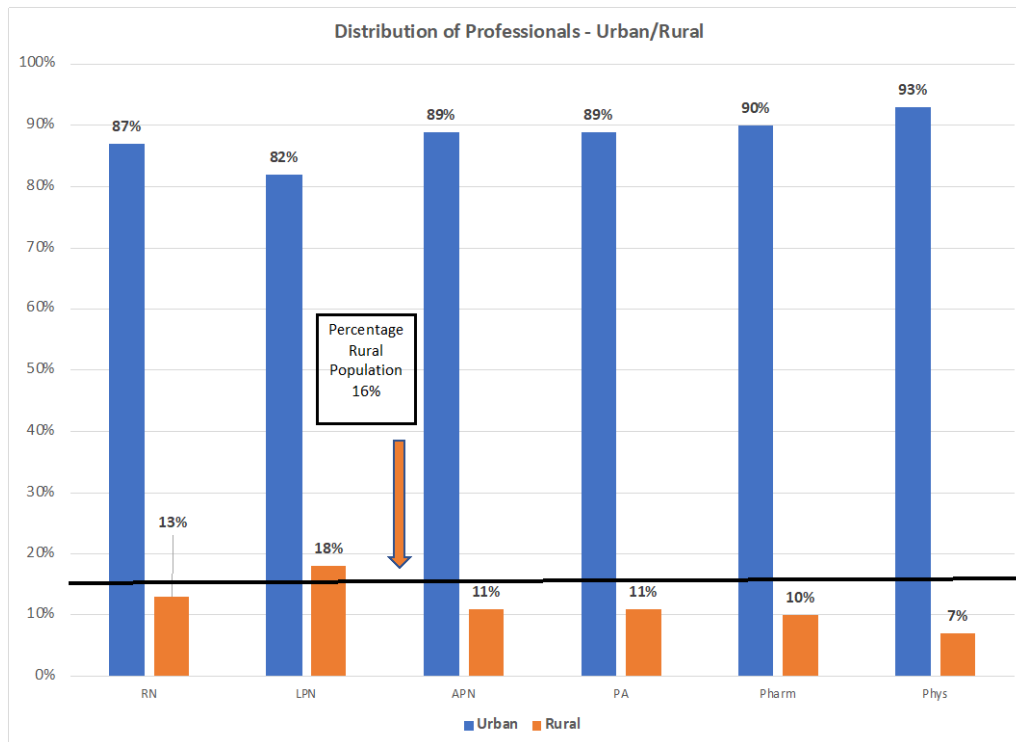
NEED FOR EVALUATING LIKELY CHANGES IN CARE DELIVERY

Please note that these are *status quo* results, reflecting current patient utilization and professional workflows. To arrive at a set of findings with some level of confidence, however, we need to consider changes that are likely to take place over the next 15 years, including:

1. Several factors could influence new entrants and attrition, including for example: how future prospective healthcare workers view the profession; average retirement age; and whether trends in work/home life choices will continue at the same rate as the past decade.
2. The status quo results reflect current utilization by care setting and demographics, which will likely change over the next 15 years, as it has in the past.
3. Demand for each profession reflects current place of work by care setting projected into the future; duties and responsibilities are likely to change and shift between the professions.

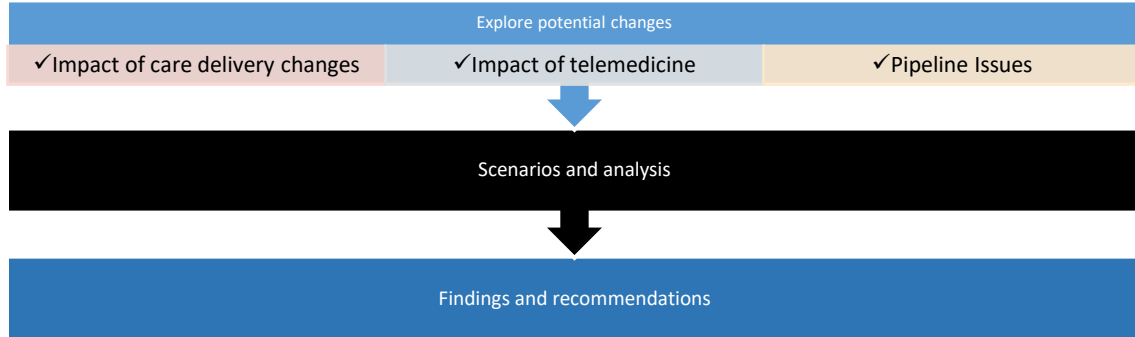
URBAN/RURAL DISTRIBUTION

An additional early takeaway regards the geographic distribution of professionals across the state. The following graph illustrates:



There has been a longstanding maldistribution of professionals in terms of both geography and underserved populations, leading to access issues affecting population health. Our report will address this issue further in the *PIPELINE* section.

The following diagram provides a conceptual overview of how we will analyze potential changes from the status quo:



CARE DELIVERY CHANGES

IMPACT OF CARE DELIVERY CHANGES

Framework:

1. Constantly evolving delivery system
2. Impacts on all professions
 - our focus will be on APCs and pharmacists
4. Review care settings/places of work/ratios
5. Capacity to incorporate APCs/pharmacists into workforce
6. Trends and research

To assess potential changes in the workforce that might result from an evolving care delivery system, we focus on our health systems' ability to adapt, technology as a facilitator of change, and our regulatory environment.

Ability of Our Healthcare System to Adapt and Change – As healthcare continues to evolve, the mix and roles of professions in care delivery has gone through dynamic change. Wisconsin's health systems have been creative in deploying their workforce to achieve high-quality and efficient results, finding ways to provide care using many different combinations of healthcare personnel. This would suggest that Wisconsin's health systems would be in a good position to accommodate limitations in the available workforce. However, the pandemic has shown us that even the most adaptable systems have limits.

Technology as a Facilitator of Change – Research and anecdotal evidence suggest that increasing use of technologies like telemedicine facilitate changes in the tasks that each profession carries out in care delivery. It also enhances provider-to-provider communication and between providers and patients, making workflow faster and more efficient.

The Regulatory Environment – The ability to substitute one healthcare profession with another in patient care is constrained by several factors, including our regulatory and payment systems. Changes in these systems tend to be slow and often involve dispute. But the pandemic made it necessary to enact changes to meet the imminent needs of the situation. Emergency orders and payment changes included:

- expanded coverage of telehealth by Medicare and other payers
- more flexible licensure requirements for physicians, nurses, and physician assistants
- expanded scope of practice for physician assistants and advanced practice nurse prescribers
- more flexible requirements for simulation in nurse training

While it is not clear at this point which of these emergency-related changes might become permanent, the fact that they were put into place and appear to have had positive results would suggest that they could become policy in the future.

Based on this analysis, it is reasonable to assume that changes that have taken place in the past will continue in some form. A number of scenarios are possible, but we will use assumptions based on available data in order to provide a range of possible outcomes, focusing on APNs and PAs.

One way of assessing this issue is to review the growth in active licenses for Wisconsin APNs and PAs, an indication of demand. Analysis shows a significant increase over the most recent 7-year period, as illustrated below (physician figures are shown for comparison purposes).

Active Licenses and Ratios	2014	2021	Percent Change
Phys	15,899	16,508	4%
APN	4,331	6,850	58%
PA	2,071	3,079	49%

Wisconsin Council on Medical Education and Workforce 2021

The annual growth rate over the seven-year period was 6.6% for APNs, 5.7% for PAs, and 0.5% for physicians. The question is whether these rates can continue and the degree to which APNs and PAs can be incorporated into the workforce by assuming new roles.

The increase in licenses is one measure, but how effectively have APNs and PAs been incorporated into the healthcare workforce? We can look at the increase in the number of those employed in healthcare settings. Data from the Wisconsin Hospital Association Annual Survey shows the following 5-year changes:

Profession	2014 FTE	2019 FTE	Total % Change	Annual % Change
Registered Nurse	25,408	28,745	17%	3%
Licensed Practical Nurse	911	1,098	21%	4%
Physician Assistant	304	636	109%	16%
Nurse Practitioner	478	1,240	160%	21%

All four disciplines show substantial increases, but the number of physician assistants and nurse practitioners had the most significant additions.

Based on the historical changes in licensures, continued high employment rates, and evolving roles, we assume that essentially all of the 2,494 will be incorporated, leaving no surplus.

Pharmacists also show a slight surplus using the status quo model. But their roles have been changing over the recent past.

THE CHANGING ROLE OF PHARMACISTS

Practice Settings	2009	2019
Retail	52%	44%
Patient Care	38%	44%
Other	10%	12%
Total	100%	100%

Activity	2009	2019
Medication Dispensing - Retail	39%	33%
Medication Dispensing - Pt Care	19%	16%
Other Patient Care	16%	27%
Business/Organization Mgt.	16%	12%
Education	4%	7%
Research	5%	6%
Other	100%	100%

A movement towards inpatient and ambulatory care settings

Source: National Pharmacy Workforce Study 2019;WCMEW analysis

The role of pharmacists in patient care has changed, as shown in the charts above. This should lead to a greater demand for pharmacists in the future. If anything, the neutral result in the status quo results could understate the future need.

OVERALL TAKEAWAY REGARDING CARE DELIVERY CHANGES

It appears likely that the roles for APNs, PAs, and pharmacists in healthcare delivery will continue to evolve, and that we cannot therefore assume a surplus. The impact on the other professions in the workforce, however, is unclear at this point. Further analysis regarding the roles of APNs, PAs, pharmacists, and physicians will be needed.

IMPACT OF TECHNOLOGY

Technology plays an integral part in healthcare delivery – including intake, diagnosis, treatment, follow-up, communications, and other tasks. Our focus will be on telemedicine and its effect on the workforce. The Health Resource and Services Administration defines telemedicine as *“the use of telecommunication and information technologies to provide clinical health care at a distance.”*

The Centers for Disease Control classifies telemedicine into ways, or modalities, that allow healthcare practitioners to connect to patients:

- **“Synchronous:** *This includes real-time telephone or live audio-video interaction typically with a patient using a smartphone, tablet, or computer.*
- **Asynchronous:** *This includes “store and forward” technology where messages, images, or data are collected at one point in time and interpreted or responded to later. Patient portals can facilitate this type of communication between provider and patient through secure messaging.*
- **Remote patient monitoring:** *This allows direct transmission of a patient’s clinical measurements from a distance (may or may not be in real time) to their healthcare provider.”*

All have shown to have a positive impact on healthcare utilization and workflow. The following table provides a summary.

Healthcare Interaction	Modality	Perceived Impact
<i>Patient visits</i>	<i>Synchronous</i>	<ul style="list-style-type: none"> • <i>More focused visits/engaged patients</i> • <i>Shorter times for many types of visits</i> • <i>Improved access in rural areas</i> • <i>Facilitates documentation</i> • <i>Patients avoid travel and waiting times</i>
<i>Triage</i>	<i>Synchronous</i>	<ul style="list-style-type: none"> • <i>Reduces ER visits</i> • <i>Reduces SNF stays</i>
<i>E-consultations</i>	<i>Synchronous and asynchronous</i>	<ul style="list-style-type: none"> • <i>Avoids unnecessary referrals</i> • <i>Reduces referral timeframes</i>
<i>Communicating results to patients</i>	<i>Synchronous and asynchronous</i>	<ul style="list-style-type: none"> • <i>Facilitates patient follow up</i> • <i>Reduces appointment no-shows</i>
<i>Managing chronic disease and preventive care</i>	<i>Remote patient monitoring</i>	<ul style="list-style-type: none"> • <i>Increases patient compliance with treatment guidelines</i> • <i>Fewer hospital admissions</i> • <i>Better long-term outcomes</i>

Each of the interactions outlined above can impact on the healthcare workforce when telemedicine is being used. Quantifying the impact on our projections would require addressing the following factors:

- Adoption rates and whether they will be sustained and/or increased
- Estimated impact on each profession

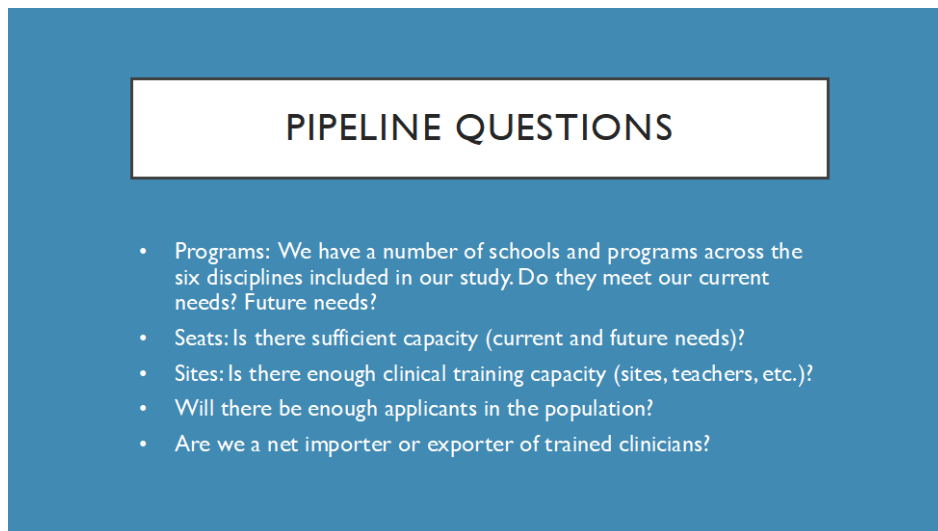
Much of telemedicine research has focused on the impact on patient satisfaction, expenses, and convenience, and on overall quality. For the most part, the results have been positive, and for that reason alone, telemedicine has shown to be beneficial in healthcare.

OVERALL ASSESSMENT OF TELEMEDICINE

In assessing the feasibility of making projections, the research and anecdotal information on telemedicine does not provide a clear enough picture to adjust our model on the future workforce. In addition, uncertainties regarding future payment and regulation make it difficult to arrive at any projections with confidence. But the impact of telemedicine on the workforce should be researched because of its potential, as we conclude in our recommendations.

EDUCATION AND TRAINING PIPELINE

In evaluating our education and training pipeline, we ask the following questions:



PIPELINE QUESTIONS

- Programs: We have a number of schools and programs across the six disciplines included in our study. Do they meet our current needs? Future needs?
- Seats: Is there sufficient capacity (current and future needs)?
- Sites: Is there enough clinical training capacity (sites, teachers, etc.)?
- Will there be enough applicants in the population?
- Are we a net importer or exporter of trained clinicians?

WISCONSIN'S SCHOOLS AND PROGRAMS

Wisconsin has a robust healthcare education and training infrastructure, but does it meet our current and future needs? Key factors include the average annual additional graduates and the percentage of graduates that are retained in Wisconsin.

The table below summarizes the sources of entrants into Wisconsin practice for the professions in our study.

Wisconsin Council on Medical Education and Workforce 2021

Discipline – Degree – Certificate	Current Annual Entrants	Annual Graduates from Schools and Programs	Estimated Percent Retained	Estimated Number Retained	Estimated Annual Immigration
Physician Assistant	183	184	66%	121	62
Advanced Practice Nurse	560	480	75%	360	200
Physician	521	375	39%	146	375
Pharmacist	242	184	63%	117	125
ADN and BSN Nurse	2,703	2,968	60%	1,781	922
LPN Nurse	463	136	75%	102	361
Totals	4,672	4,327	61%	2,627	2,045

1. Annual entrants: most recent five-year average.
2. Annual graduates: information from schools and programs. Physicians include GME grads.
3. Percent retained: obtained from schools, programs, AAMC.

There is a range of percent of graduates retained for each program, with the overall result totaling 2,627. So, while Wisconsin trains a substantial number of professionals, it still must import an additional 2,049. Furthermore,

By the year 2035, the following table illustrates what will be needed:

Discipline, Degree, Certificate	Annual Entrants Needed in 2035	Projected Annual Graduates from WI	Estimated Percent Retained	Number Retained	Immigration Needed
Physician Assistant	136	184	66%	121	15
Advanced Practice Nurse	428	480	75%	360	68
Physician	701	450	45%	203	499
Pharmacist	150	184	63%	117	33
ADN and BSN Nurse	3,777	2,968	60%	1,781	1,996
LPN Nurse	1,019	136	75%	102	917
Totals	6,211	4,402	61%	2,683	3,528

1. Annual entrants needed includes increases in demand, lifestyle changes, and attrition.
2. Annual graduates: information from schools and programs. Physicians include GME grads.
3. Percent retained: obtained from schools, programs, AAMC. Additional physician retention from GME grant program.

OVERALL ASSESSMENT

The significant increase in the number of new entrants needed in the workforce in 2035 will not be met by our education and training infrastructure if it remains the same. And it is very unlikely that we will be able to attract sufficient numbers of providers from outside our state to fill the gap as exporting states work harder to retain providers to address their own shortages. The 20 to 44 age cohort at the national level is expected to grow at only a 5% rate over the next 15 years, and other states will be in a similar situation to Wisconsin – needing to retain enough of their own residents.

Secondly, our State needs to continue to place an emphasis on workforce maldistribution issues. Fortunately, Wisconsin has already taken steps to address the issue, across several professions and areas of their pipelines. Specifically:

- In 2006, the University of Wisconsin School of Medicine and Public Health (SMPH) created two programs – one focusing on urban areas, called Training in Urban Medicine and Public Health (TRIUMPH), and the other named Wisconsin Academy for Rural Medicine (WARM). Both programs target potential students showing a desire and propensity for practicing in underserved areas. Since 2008, TRIUMPH has graduated 208 students. The WARM program admits 26 students a year; 91% are practicing in Wisconsin.
- In 2016, the Medical College of Wisconsin has established two new community-based medical school campuses, one in Wausau and one in Green Bay, each of which has a capacity to teach 25 students. In the MCW-Central Wisconsin's inaugural class, 11 came from central Wisconsin.
- In 2015, the legislature enacted a grant program, administered by the Wisconsin Department of Health Services, that provides start-up funds to hospitals that are either starting or expanding graduate medical education programs in underserved areas. Currently, 37 programs are graduating over 100 physicians per year; over 50% are practicing in Wisconsin.
- In 2017 the legislature enacted a grant program providing funds to health systems that initiate new training programs for advanced practice providers (APCs). Thus far, 21 programs have been started. Retention information is not available at this time.

These programs have shown very positive results for rural Wisconsin and need to be regularly strengthened in order to continue to improve access to the underserved.

In summary, meeting our future workforce needs will require significant expansion of nursing and physician education capacity in Wisconsin, as well as increases in the number of clinical training sites.

COVID Pandemic: Blip or Inflection Point?

The COVID pandemic has had a significant impact on healthcare, particularly during its peak period. Health systems were forced to limit the number of patients seen, reconfigure sites of care, secure protective resources for workers, and find workarounds for functions such as clinical training.

A question that continues to be raised is whether there will also be long-term effects. Feedback from WCMEW constituents (Council, work group members, and others) suggests the following:

- The impact of delayed care on chronic disease and other conditions. The lack of early diagnosis and treatment of diseases such as cancer will have long-term impacts on incidence of disease and therefore demand for healthcare.
- The temporary/emergency regulatory changes that eased scope of practice and other restrictions are likely to become permanent and/or provide impetus for further easing of those restrictions.
- The disruption in the clinical training experience was felt by virtually all healthcare professions. WCMEW's Clinical Training Sites work group studied the issue and arrived at the following conclusions and recommendations:
 - Health systems were more able to adjust their training sites than schools and programs were in modifying their requirements. Perhaps this should lead to a greater level of communications between healthcare delivery and educational institutions.
 - Elements of the curricula need to include better preparation for pandemics, and more interface with public health. Again, health providers and schools should discuss this.
- Greatly increased use of telehealth – likely permanent.
- Increased attrition from the workforce due to burnout and concerns about personal well-being. It is not clear whether this phenomenon is temporary or permanent. In addition, several schools have indicated a drop off in interest in their programs.

KEY TAKEAWAY

Much about the impact of COVID on the future workforce remains unclear given that we are still in its midst. A future retrospective will be needed.

OVERALL FINDINGS OF THIS STUDY

Our findings are based on the model outlined at the beginning of this paper and use data that we find credible and reliable. We were not able to reach findings regarding how technology might impact on the workforce. Nor were we able to fully model changes in care delivery. Nevertheless, we feel that our findings are sound based on available and reliable information.

Our major findings are as follows:

1. Initial findings show shortages across a number of disciplines, including registered nurses, licensed practical nurses, and physicians. Our current pipelines for these professions is not sufficient to fill the shortages.
2. Further analysis suggests that there will be no surplus of APNs, PAs, and pharmacists. They will be incorporated into the workforce, provided that there will be capacity in the education and training pipeline, and continued movement of APNS, PAs, and pharmacists into new roles.
3. The projected static working age population, at the state and national levels, will diminish the number of potential students in Wisconsin and available workers from other states.
4. *There will be a significant shortage of nurses unless the pipeline is dramatically expanded.* While shortages for any of the healthcare professions will have an adverse impact, the projected nursing shortage will have a far-reaching effect on healthcare delivery.
5. Workforce data sources are inconsistent and often lack timeliness.

RECOMMENDATIONS

Our recommendations flow from our findings. They are supplemented by suggesting further analysis and study of those areas where we did not have sufficient confidence to use in our model, but that we nevertheless feel would have value in making long-term healthcare workforce projections.

Our recommendations include:

1. Education and training resources for all of the professions in our study need to be expanded or modified, including for example, the number of available openings, faculty, and clinical sites.
2. Continue to expand the Department of Health Services grants for Graduate Medical Education and Advanced Practice Providers.
3. Inventory the number and capacity of clinical training sites; identify and help disseminate best practices in clinical experiences, including, for example, enhancing partnerships with communities.
4. Explore in greater depth the impact that telemedicine is having on care delivery; ensure incorporation of telemedicine in healthcare education and training.
5. Gain a better understanding of the nature and extent of care delivery changes.

6. Carry out a retrospective study of the long-term effects of the pandemic.
7. Evaluate the feasibility of gathering workforce data on a more consistent and timelier basis.

APPENDIX A – DATA SOURCES AND LIMITATIONS

The table below provides a summary of the data sources used in this project.

Data Needed	Source	Organization
Utilization		
- Inpatient Hospital	Hospital Data Submissions: Annual Hospital Survey	WHA Information Center
- Outpatient Hospital	Hospital Data Submissions: Annual Hospital Survey	WHA Information Center
-ER Visits	Hospital Data Submissions: Annual Hospital Survey	WHA Information Center
-Clinic Visits	Insurance Claims Information	WHAIC/WI Health Information Organization
-Outpatient Surgery	Hospital and FSC Data Submissions: Annual Hospital Survey	WHAIC
-Long Term Care	CMS Nursing Home Data Compendium 2015; WI Legislative Fiscal Bureau Analysis	CMS; KFF; LFB
-Home Health	CDC National Study of Long-Term Care Providers 2016	CMS; LFB
Professions: FTEs, Practice Sites		
-RN	Licensed Professionals from the WI Dept of Safety and Professional Services; Annual Hospital Survey; RN Survey	WI DSPS;WHAIC; WI Center for Nursing
-LPN	Licensed Professionals; Annual Hospital Survey; LPN Survey	WI DSPS; WHAIC; WI Center for Nursing
-APRN	Licensed Professionals; Annual Hospital Survey; RN Survey	WI DSPS; WHAIC; WI Center for Nursing
-Pharmacist	Licensed Professionals; Annual Hospital Survey; National Pharmacy Workforce Study	WI DSPS; WHAIC; American Association of Colleges of Pharmacy
-Phys: Primary Care	Licensed Professionals; Annual Hospital Survey; National Ambulatory Medical Care Survey (NAMCS)	WI DSPS; WHAIC; National Center for Health Statistics
-Phys: Medical	Licensed Professionals; Annual Hospital Survey; NAMCS	WI DSPS; WHAIC; National Center for Health Statistics
-Phys: Surgical	Licensed Professionals; Annual Hospital Survey; NAMCS	WI DSPS; WHAIC; National Center for Health Statistics
-Phys: Other	Licensed Professionals; Annual Hospital Survey; NAMCS	WI DSPS; WHAIC; National Center for Health Statistics

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-Physician Assistant	Licensed Professionals; Annual Hospital Survey; National Commission on Certification of Physician Assistants	WI DSPS; WHAIC; National Center for Health Statistics; NCCPA
Population and Demographics		
Current	Population Estimates	WI Dept of Administration
Future	Population Projections	WI Dept of Administration

There are multiple sources of data, some being national averages and others with Wisconsin-specific information. The collection is rich and varied, but it also imposes a number of challenges to our analysis, such as:

1. Varying timeframes for available data; some lack of current data
2. Differing population age cohorts
3. Differing definitions for services and practice sites
4. Disparities between Wisconsin and national data

When presented with these differences, we chose the “best fit” for the circumstances, giving more weight to Wisconsin-level data, consistent definitions, and information from the most recent periods.

APPENDIX B – PROJECTING CHANGES IN UTILIZATION BY CARE SETTING

For our analysis, all healthcare services are classified into one of four categories:

- Ambulatory care
- Home health
- Hospital
- Long-term care

The rationale for this classification scheme is that it is found in a number of sources that report on healthcare utilization by population. In addition, it is used in reports on healthcare professions sites of care (or places of work). Therefore, as will be seen in the following sections, it will be used as a method for projecting both changes in utilization and resulting demand for each of the professions.

Ambulatory care

The National Center for Health Statistics (NCHS) surveys physicians to track physician office visits. One survey, conducted in 2007, provided physician utilization data for various age cohorts. The table below was created by combining the NCHS data with Wisconsin population data from the Department of Administration.

Age Cohort	Visits per 100	2020 WI Population	2020 WI Visits	2035 WI Population	2035 WI Visits
under 15	328.9	1,115,765	3,669,751	1,167,145	3,838,740
15-24	250.9	766,235	1,922,484	789,680	1,981,307
25-44	299.0	1,492,505	4,462,590	1,528,290	4,569,587
45-64	417.8	1,566,645	6,545,443	1,482,520	6,193,969
65-74	664.5	625,030	4,153,324	713,845	4,743,500
75+	823.3	438,900	3,613,464	794,790	6,543,506
All	381.9	6,005,080	24,367,056	6,476,270	27,870,609
Percent Change				7.8%	14.4%
National Ambulatory Medical Care Survey 2007 Summary; WI DOA; WCMEW analysis					

Utilization patterns vary across age categories, with the over 65 cohorts showing 2 to 3 times as much as the overall population. While the overall population is projected to increase by 7.8%, demand for ambulatory care is projected to increase by 14.4%.

Home health care

The 2016 Centers for Disease Control Study on long-term care analyzed home health care usage across age categories and found that those over the age of 65 consumed home health care at a dramatically higher rate than those in younger age categories. The following table uses those utilization rates and applies them to Wisconsin’s current and projected population for those same categories, with the resulting results:

Age Cohort	2020			2035		
	Population	% Cohort using HHC	HHC Users	Population	% Cohort using HHC	HHC Users
Under 65	4,941,150	0.2%	8,100	4,967,635	0.2%	8,144
65 to 74	625,030	0.6%	9,309	713,845	0.6%	4,147
75 to 84	304,770	2.4%	11,969	570,545	2.4%	13,545
85+	134,130	9.2%	10,921	224,245	9.2%	20,742
Total	6,005,080	0.7%	40,300	6,476,270	0.7%	46,579
Percent Change				7.8%		15.6%

The projected demand for home health care is expected to be approximately double the overall increase in population.

Hospital services

“Hospital services” covers a number of discrete areas, including emergency room visits, inpatient hospitalizations, observation days, outpatient surgeries, and other outpatient hospital visits. For our analysis, we obtained utilization data from the Wisconsin Hospital Association Information Center (WHAIC) for all hospital encounters for the year 2019. Data was segmented by age and gender.

Our analysis started by calculating an average encounter per age range and gender for each hospital service, as shown below.

Counts Per Person Per year - 2019						
Age Band	Gender	ED Visits	Inpatient Hospital	Observation	Outpatient Surgery	Other OP Hosp

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0-17	F	0.23	0.06	0.01	0.03	0.66
	M	0.23	0.06	0.01	0.04	0.65
18-24	F	0.68	0.11	0.04	0.07	1.36
	M	0.37	0.04	0.01	0.05	0.58
25-44	F	0.42	0.11	0.03	0.12	1.47
	M	0.28	0.04	0.01	0.07	0.62
45-64	F	0.27	0.08	0.03	0.28	2.26
	M	0.25	0.09	0.03	0.23	1.49
65-74	F	0.26	0.14	0.04	0.39	3.86
	M	0.22	0.16	0.04	0.36	3.24
75+	F	0.43	0.28	0.09	0.30	4.12
	M	0.44	0.32	0.09	0.38	4.57
Wisconsin Hospital Association Information Center; WCMEW Analysis						

Once again, we find significant variation across age ranges and genders for each service, with the older populations showing the greatest disparity from the rest.

When combined with the projected 2035 population, the following results:

Total Counts - 2035							
Age Band	Gender	ED Visits	Inpatient Hospital	Observation	Outpatient Surgery	Other OP Hosp	Totals
0-17	F	178,651	46,678	4,737	25,200	510,161	765,426
	M	186,124	46,845	5,007	31,635	523,041	792,653
18-24	F	126,774	20,463	7,994	13,829	253,632	422,691
	M	72,454	7,276	2,128	9,748	113,248	204,853
25-44	F	310,775	80,171	23,468	88,833	1,096,656	1,599,904
	M	220,233	31,450	9,542	52,468	486,703	800,397
45-64	F	200,063	58,045	21,189	204,564	1,647,276	2,131,138
	M	189,409	68,539	21,176	172,124	1,123,458	1,574,706
65-74	F	93,491	52,477	15,855	142,438	1,412,328	1,716,588
	M	75,799	56,776	14,931	126,896	1,126,641	1,401,043
75+	F	192,950	123,453	42,119	135,575	1,842,747	2,336,844

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	M	151,830	111,484	32,594	133,174	1,586,762	2,015,845
Totals		1,998,552	703,656	200,740	1,136,485	11,722,655	15,762,089
Percent Change from 2019		9.6%	20.4%	22.0%	13.9%	17.8%	16.6%

While the overall population is projected to increase by 7.8%, the demand for hospital services is projected to increase by 16.6%, with variation among types of hospital services.

Long-term care

Long-term care consists of a number of services provided to those in need of extended care. The patient populations and forms of services have changed over time, but in general, they fall into the categories of inpatient care facilities, assisted living, and home care. We have previously addressed home health care, so will focus on facility-based care in this section.

The nursing home field has undergone significant change over the past ten years. Since 2010, due to lack of funding sources, more than 45 skilled nursing facilities have closed in Wisconsin. The average number of patients has dropped from over 33,000 in 2012 to 21,236 in 2020. In addition, Wisconsin’s Family Care program, which provides alternatives to inpatient care, has been growing in size and scope. This makes nursing home demand difficult to assess over the next 15 years.

Nevertheless, the need for skilled and extended care is expected to grow, given the projected increase in the over-65 population. Our approach in assessing this healthcare service will be to assume that the status quo will continue. But as we mentioned in the opening sections, more discussion of alternative scenarios will follow – recognizing that this area is likely to present the most dynamic set of alternatives.

A status quo projection assumes the current average number of patients, as a component of the Wisconsin population age ranges, will be the same in the 2035 population. The table below is derived from the 2015 CMS Nursing Home Compendium. We allocate the 21,236 average number of Wisconsin nursing home residents among the age ranges in the same ratios as in the CMS report. We then apply those same ratios to the projected 2035 population.

Age Range	2020			2035		
	Population	% Population NH Residents	Estimated WI NH Residents	Population	% Population NH Residents	Estimated WI NH Residents

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Under 21	1,508,540	0.0%	-	1,575,405	0.0%	-
21 to 30	750,015	0.0%	21	758,510	0.0%	21
31 to 64	2,682,595	0.1%	2,017	2,633,720	0.1%	1,981
65 to 74	625,030	0.4%	2,803	713,845	0.4%	3,201
75 to 84	304,770	1.8%	5,585	570,545	1.8%	10,456
85 to 94	119,265	7.1%	8,516	203,440	7.1%	14,526
95+	14,865	15.4%	2,293	20,805	15.4%	3,210
Total	6,005,080	0.35%	21,236	6,476,270	0.35%	33,395
Percent Change						57.3%
2015 CMS Nursing Home Data Compendium; WCMEW Analysis						

The projected percentage increase in demand is significant, but the questions surrounding dynamic changes in the nursing home need to be addressed in our analysis.

APPENDIX C – CURRENT WORKFORCE SUPPLY AND PROJECTED DEMAND

Two separate methods are used for projecting future demand for the healthcare workforce: one for nursing, physician assistants, and pharmacists, and another for physicians. The use of different methods is driven by available data sources, but both rely on changes in population and demographics as the independent variable.

Current supply and projected demand for nursing, pharmacists, and physician assistants

The construct for all three professions consists of the following steps:

- Identifying the total licensed and active persons practicing in Wisconsin and involved in patient care
- Allocating FTEs to one of four practice sites: ambulatory care, home health, hospital, or long-term care – we only considered those professionals in direct patient care in our analysis
- Applying the projected utilization changes to the sites – ***we considered the practice sites and service areas to be equivalent*** – this is a key assumption, making the projections a function of both place of work and patient care categories
- Arriving at projected increases in demand for each profession

Lifestyle Changes as Modifications to FTE Workforce Supply Estimates

A key factor in making supply projections includes changes in the estimated number of hours worked (patients seen) from lifestyle changes over the next 15 years. We need to arrive at full-time equivalents because the number of patients seen is our measure of supply, not head counts of professionals.

Changes in patients seen by physicians – A 2010 article in the Journal of the American Medical Association, using data from the 1998 and 2008 Current Population Surveys, showed a decrease of 5.7% in physician hours worked over the previous decade. It also shows that female physicians worked 14% fewer hours. If we assume that by 2035, approximately 50% of physicians will be female, the two factors combined would lead to a 10% decrease attributable to lifestyle changes. Since we did not have more recent reliable information, we used a more conservative estimated decrease of 7% over the next 15 years.

We could not identify similar data for other professions. We used, as a proxy, information from the same AMA study that showed a 3.7% reduction in hours for the entire population under the age of 45 over a ten-year period. We used that percent decline for the other professions, again understanding that it would be a conservative estimate.

Nursing

In our analysis, we examined the nursing profession across three broad categories: registered nurses (RNs), licensed practical nurses (LPNs), and advanced practice nurses (those with advanced degrees, and licensed in Wisconsin as Advanced Practice Nurse Prescribers). Our rationale was based on location of practice and scope of practice. This segmentation allows for a more focused analysis.

RNs

The table below demonstrates the methodology. First, the number of RNs is allocated to place of work (or site). In this case, we used the 2020 RN survey. Second, we used the projected utilization change for each care category that was calculated in the previous section. Third, the projected demand for RNs involved in patient care in the year 2035 is calculated using current RNs and the projected change in utilization for their place of work (site of care).

	RNs Place of Work 2020	Projected Utilization Change	Projected Demand 2035
Ambulatory Care	16,163	14.4%	18,490
Home Health	3,880	15.6%	4,485
Hospital	35,740	16.6%	41,673
LTC	5,039	57.3%	7,926
Totals	60,822	19.3%	72,575
Wisconsin 2020 RN Survey; WCMEW Analysis			

The total projected increase in demand for RNs is 19.3%.

LPNs

The same methodology is used for projecting LPN demand. The table below illustrates.

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	LPNs Place of Work 2018	Projected Utilization Change	Projected Demand 2035
Ambulatory Care	3,686	14.4%	4,216
Home Health	801	15.6%	926
Hospital	883	16.6%	1,030
LTC	5,040	57.3%	7,927
Totals	10,409	35.4%	14,099
Wisconsin 2019 LPN Survey; WCMEW Analysis			

The total projected increase in demand for LPNs is 35.4%.

APNP/APRN

Following the same methodology as above:

	APRNs Place of Work 2018	Projected Utilization Change	Projected Demand 2035
Ambulatory Care	3,539	14.4%	4,049
Home Health	137	15.6%	158
Hospital	2,726	16.6%	3,179
LTC	269	57.3%	423
Totals	6,671	17.1%	7,809
Wisconsin 2018 RN Survey; WCMEW Analysis			

The total projected increase in demand for APRNs is 17.1%.

There is a good deal of fluidity between the various nursing licensures due to a significant number of nurses pursuing advanced degrees.

Physician Assistants

Practice site information for PAs is available from the National Commission on Certification of PAs (NCCPA). This organization publishes survey results on both a national basis and one that provides some level of detail by state. The latest reports are from 2019 and use survey results from 2018.

The complications for our analysis are that the Wisconsin-level data only include the highest percentage sites, and does not include home care and long-term care. In addition, the national data shows very small percentages for those two sites (0.3% for long-term care and 0.1% for home health).

We chose to blend the two results together, resulting in the following distribution:

- Hospital – 47.6% using Wisconsin-specific data
- Ambulatory care – 45.9% blending Wisconsin-specific data with national
- Home health – 0.1% using national data
- Long-term care – 0.3% using national data

We then allocate the total licensed PAs of 2,874 to one of those categories based on the percentages. The remainder of PAs are assumed to be working in non-patient areas. The table is below:

	NCCPA and WI Blended %	PAs Place of Work 2019 from Blended %	Projected Utilization Change	Projected Demand 2035
Ambulatory Care	47.6%	1,368	14.4%	1,565
Home Health	0.1%	3	15.6%	3
Hospital	45.9%	1,319	16.6%	1,538
LTC	0.3%	9	57.3%	14
Totals	93.9%	2,699	15.6%	3,120
NCCPA Report; WCMEW Analysis				

The overall increase in demand for PAs is projected to be 15.6%.

Pharmacists

Wisconsin is fortunate to have a state-specific workforce analysis for pharmacists, published by a consortium of Wisconsin pharmacy schools. We used their 2020 report.

In addition, because a significant percentage work in retail pharmacies, which we considered as patient care, we added that category to the practice sites. We used prescriptions as the measure of utilization and projected the number for 2035 using existing utilization rates by age cohort and the projected population/demographic changes. The resulting projected increase in prescriptions for 2035 was 14%.

After including the retail pharmacy category, we used the same methodology as we used for PAs. The table is shown below.

	Wisconsin Pharmacy Workforce Study %	Pharmacist Place of Work	Projected Utilization Change	Projected Demand 2035
Ambulatory Care	10.1%	661	14.4%	757
Home Health	0.3%	20	15.6%	23
Hospital	41.6%	2,724	16.6%	3,177
LTC	4.4%	288	57.3%	453
Community Pharmacy	33.8%	2,214	14.0%	2,523
Totals	90.2%	5,907	17.4%	6,933
WI Pharmacy Workforce Study; WCMEW Analysis				

The increase for pharmacists is projected to be 17.4%

PROJECTING PHYSICIAN DEMAND

In projecting physician demand for 2035, we shifted methodologies and focused on specialty areas instead of practice setting. This change was dictated largely due to availability of data. Nonetheless, the basic method of using utilization data by age and gender, and projecting population and demographics into the future, remained the same. Our source for the utilization data was the National Center for Health Statistics, which produced a series of reports on physician utilization using the National Ambulatory Medical Care Survey for 2015-2016. The reports covered fourteen specialties and provide the percent distribution of office visits by age category for each specialty.

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Using these reports, we created the following table:

Specialty	Percent of visits by age category					
	under 15	15 to 24	25 to 44	45 to 64	65 to 74	75+
Cardiovascular	n/a	n/a	6.5%	31.7%	27.3%	34.5%
Dermatology	4.5%	7.9%	17.6%	29.6%	22.3%	18.1%
GP/FP	6.8%	6.5%	21.5%	37.1%	16.4%	11.7%
General Surgery	n/a	5.8%	20.3%	39.7%	21.4%	12.8%
Internal Medicine	n/a	n/a	24.3%	38.1%	17.7%	19.9%
Neurology	n/a	12.0%	18.9%	35.3%	19.9%	13.9%
OB/GYN	n/a	20.1%	57.3%	17.0%	4.3%	1.3%
Ophthalmology	n/a	n/a	14.6%	28.5%	29.4%	27.5%
Orthopedic Surgery	n/a	12.1%	17.3%	38.8%	18.9%	12.9%
Osteopathic Medicine	n/a	17.1%	21.3%	33.6%	15.9%	12.0%
Otolaryngology	15.6%	7.4%	15.9%	30.8%	16.4%	13.8%
Pediatrics	87.6%	12.5%	n/a	n/a	n/a	n/a
Psychiatry	n/a	28.7%	26.6%	34.1%	7.5%	3.0%
Urology	n/a	n/a	14.9%	32.4%	27.2%	25.4%
All Physicians	15.1%	7.5%	18.6%	29.7%	15.6%	13.5%
National Center for Health Statistics; WCMEW analysis						

The table shows wide variation in utilization across specialties and age categories. For example, the highest percentage cardiovascular-related visits are among the older age categories, while visits for neurology diagnoses show an even spread, with the 45-to-64 age category being the highest.

When combined with the projected changes in population and demographics, the following table results:

Specialty	Projected percent Increase in visits						
	under 15	15 to 24	25 to 44	45 to 64	65 to 74	75+	Tot % Chng
Cardiovascular	n/a	n/a	0.2%	-1.7%	3.9%	28.3%	30.7%
Dermatology	0.2%	0.2%	0.4%	-1.6%	3.2%	14.8%	17.3%
GP/FP	0.3%	0.2%	0.5%	-2.0%	2.3%	9.6%	11.0%
General Surgery	n/a	0.2%	0.5%	-2.1%	3.0%	10.5%	12.1%

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Internal Medicine	n/a	n/a	0.8%	0.9%	2.5%	16.3%	20.5%
Neurology	n/a	0.5%	0.5%	-1.9%	2.8%	11.4%	13.3%
OB/GYN	n/a	0.8%	1.4%	-0.9%	0.6%	1.1%	2.9%
Ophthalmology	n/a	n/a	0.5%	-1.5%	4.2%	22.5%	25.7%
Orthopedic Surgery	n/a	0.5%	0.4%	-2.1%	2.7%	10.6%	12.1%
Osteopathic Medicine	n/a	0.7%	0.5%	-1.8%	2.3%	9.8%	11.5%
Otolaryngology	0.7%	0.2%	0.4%	-1.7%	2.3%	11.3%	13.3%
Pediatrics	4.0%	0.4%	n/a	n/a	n/a	n/a	4.4%
Psychiatry	n/a	1.1%	0.6%	-1.8%	1.1%	2.5%	3.5%
Urology	n/a	n/a	0.5%	-1.7%	3.9%	20.8%	23.4%
All Physicians	0.7%	0.2%	0.4%	-1.6%	2.2%	11.1%	13.1%
National Center for Health Statistics; WCMEW analysis							

The table shows an overall increase in physician demand of 13.1%, with wide variation between specialties. Note the impact of the 45-to-54 age category on visits. This cohort is projected to decrease by more than 5% by 2035.

Currently, there are 17,861 licensed physicians in Wisconsin. A 13.1% projected increase in demand suggests a need for 20,201 physicians by 2035.

SUMMARY OF PROJECTED DEMAND FOR ALL APNS, PAs, and Pharmacists

On our first pass at calculating demand for Wisconsin's healthcare future workforce, we see substantial increases across all of these professions, as shown in the table below:

Profession	Current	Projected Demand	Percent Change
Registered Nurses	60,822	72,575	19.3%
Licensed Practical Nurses	10,409	14,099	35.4%
Advanced Practice Nurse Prescribers	6,671	7,809	17.1%
Pharmacists	5,907	6,933	17.4%
Physician Assistants	2,699	3,120	15.6%

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Physicians	17,861	20,201	13.1%
Totals	104,369	124,737	19.5%

All show double-digit increases in demand, assuming no changes in care delivery methods.