North Dakota Nursing Needs Study: Direct Care Supply and Demand Projections

Center for Rural Health

North Dakota Center for Health Workforce Data

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Projected Supply and Demand of Nurses

An imbalance between the supply and demand of nurses may be characterized in three ways. First, the supply of nurses may exceed demand. This can result in high unemployment rates and low wages. The second imbalance may be a maldistribution of nurses. This is apparent in North Dakota in that the majority of nurses are in large population centers and more rural counties have insufficient nurses. The third imbalance, a nursing shortage, occurs when there are not enough nurses to meet demand. Current and predicted shortages are determined by comparing the supply of nurses and the demand for nurses and projecting this comparison into the future. The resulting projections are estimates based on assumptions and several cautions are necessary when interpreting them.
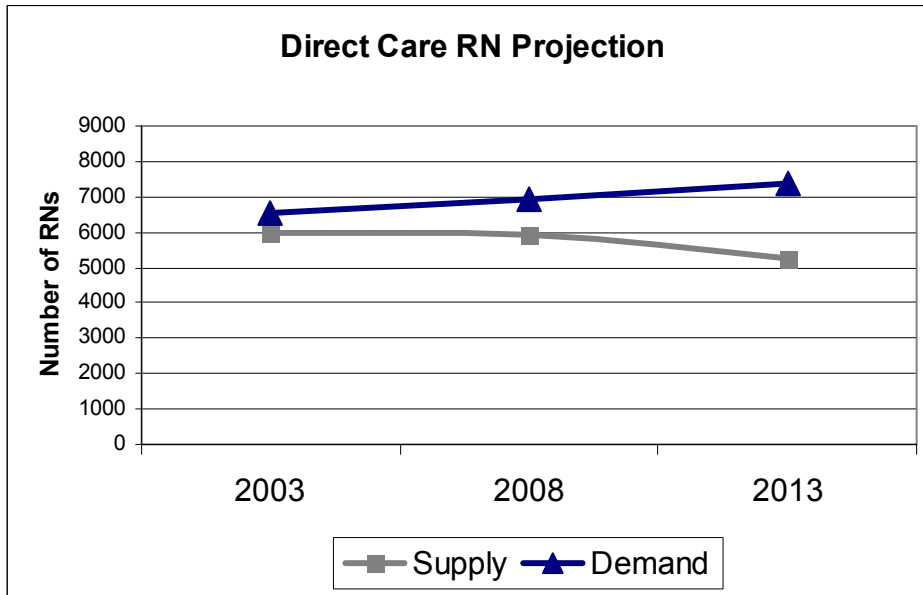
Demand projections are based on selected national and state factors along with historical trends. Direct care supply projections are based on historical trends and estimates of when nurses will leave direct care nursing. These estimates may be influenced by a variety of factors, for example; a change in licensure laws, an aging population and variation in strength of the economy. The impact of all potentially influential factors on these estimates is not incorporated in these projections. Also, projections are statewide estimates and may not reflect city or county level shortages. These estimates are based on the number of nurses and not the full-time equivalent of nurses which would not reflect the impact of a large number of part-time nurses.

- **Demand for RNs is expected to rise, whereas LPN demand is expected to remain stable.** In 1998, the labor category of registered nurse had the 9th most annual openings in North Dakota and is projected to grow to the 5th or 6th occupation with the most annual openings by 2010. Licensed practical nurse was the 27th largest occupation in 1998 and will remain in the top 40 occupations in North Dakota in 2010. (Source: Job Service of North Dakota (2001, 2003). Employment Projections 1998-2008, 2000-2010).
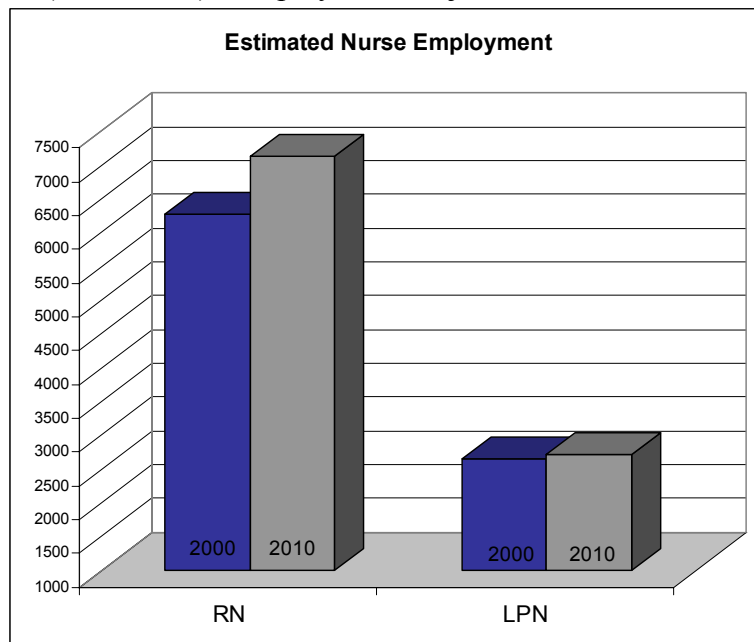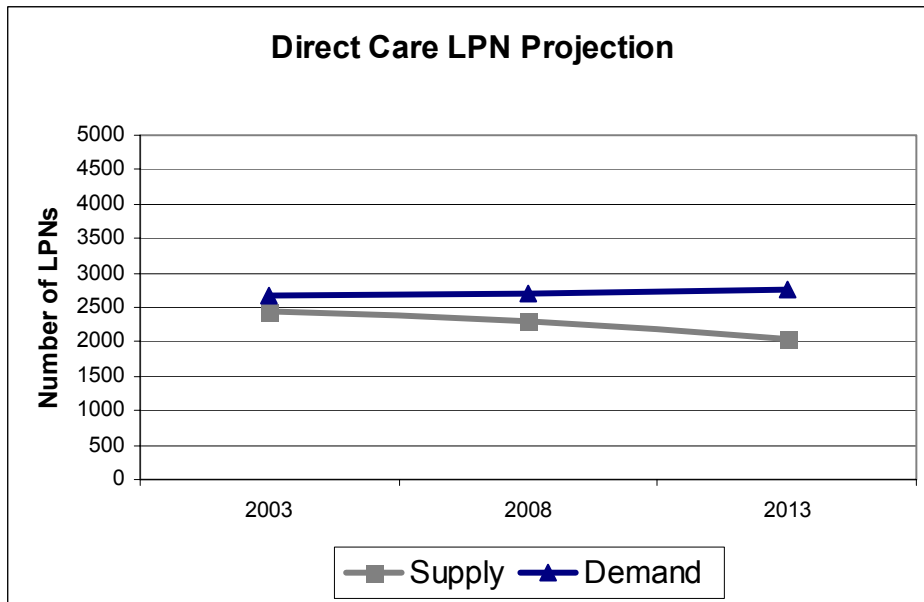

Source: Data from Job Service of North Dakota (2003). Employment Projections 2000-2010.

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- **Currently North Dakota has a shortage (not enough supply to meet demand) of approximately 500 RNs which is projected to increase to a shortage of about 2,000 RNs by 2013.**

Direct Care RN Projection

Source. Demand projections derived from Job Service of North Dakota Employment Projections 2000-2010. Annual growth of 84.5 RNs/year assumed to continue at same rate through 2013. Supply projections are based on number of licensed nurses, lapsed licenses, newly licensed, number employed in nursing, number in direct care and number leaving direct care.

- **North Dakota has a shortage of approximately 200 LPNs. While not as great as the current shortage of RNs, this shortage is projected to increase to about 700 LPNs by 2013.**

Direct Care LPN Projection

Source. Demand projections derived from Job Service of North Dakota Employment Projections 2000-2010. Annual growth of 7.7 LPNs/year assumed to continue at same rate through 2013. Supply projections are based on number of licensed nurses, lapsed licenses, new licensed, number employed in nursing, number in direct care and number of nurses leaving direct care.

The U.S. Department of Health and Human Services (HRSA,2002) projects a FTE (full-time equivalent) RN shortage beginning in 2005 and continuing through 2020 for North Dakota. HRSA cautions that their projection may be inaccurate for rural states and states with a large elderly population.

Health Resources and Services Administration, DHHS
North Dakota FTE (Full-Time Equivalent)
RN Projections
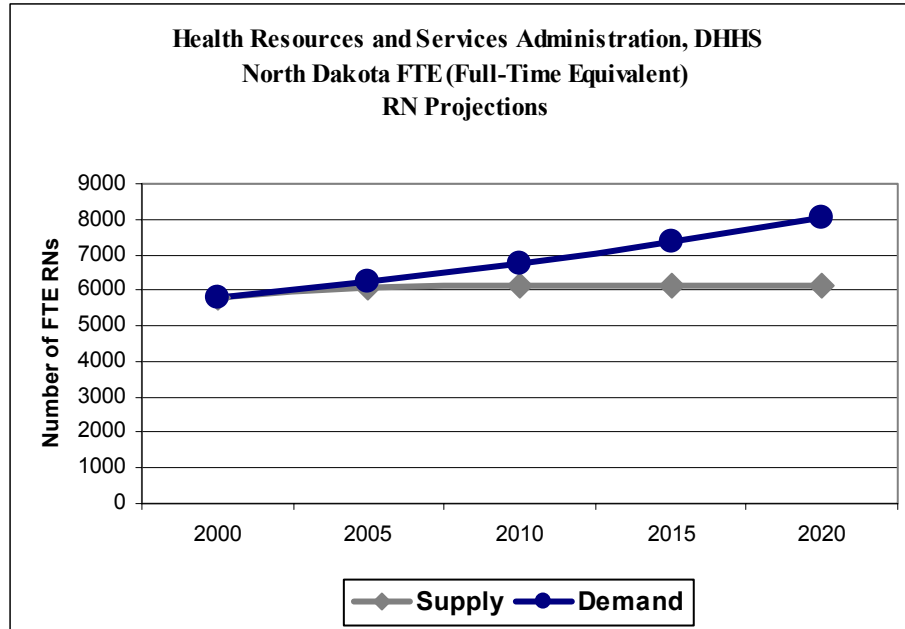
Source: USDHHS Health Resources and Services Administration, Bureau of Health Professions, National Center for Health Workforce Analysis (2002) Projected Supply, Demand and Shortages of Registered Nurses: 2000-2020.

HRSA projections and the Center for Rural Health (CRH) projections differ, this difference is likely because the CRH projections are based on a head count of direct care nurses whereas HRSA projections are based on the number of full-time equivalent (FTE) nurses. CRH projections are calculated using available data from Job Service of North Dakota, the North Dakota Board of Nursing and the North Dakota Nursing Needs Study. Demand estimates derived from Job Service of North Dakota Employment Projections are based on a head count and consequently supply estimates were also calculated using a head count. No national projections exist for LPNs.

Calculation of Direct Care Nursing Supply Projections

Workforce supply projections were calculated by modifying a model from Oregon's Nursing Shortage: A Public Health Crisis in the Making (2001) The model involves calculating the supply of nurses over a ten year period, using averages in predicting future supply. The original model was modified by estimating the number of nurses that are in direct care from survey data. The demand data is based only on those in direct care, thus making this alteration necessary. Also, an estimate of the number of nurses not working in nursing was used in order to better characterize the actual nursing workforce. Also, instead of retirement rates the rate at which nurses are planning to leave direct care using survey data was used in order to improve accuracy.

Table 1: RN Data Needed for Supply Projections

Year	Total # Licensed[1]	Net Gain # [2]	Net Gain % [3]	# New Graduates[4]	New License by Exam[5]	New License by Endorsement[6]	Predicted Total[7]	# of Lapsed Licenses[8]
1990	7056				152	168		
1991	7116	60	0.84%		195	125	7376	260
1992	7373	257	3.50%	316	234	179	7529	156
1993	7587	214	2.80%	382	315	123	7811	224
1994	7673	86	1.20%	352	306	100	7993	320
1995	7910	237	3.00%	347	290	170	8133	223
1996	8205	295	3.60%	359	274	286	8470	265
1997	8296	91	1.10%	347	297	167	8669	373
1998	8308	12	0.14%	342	287	132	8715	407
1999	8273	-35	-0.42%	335	249	126	8683	410
2000	8271	-2	-0.02%	337	219	141	8633	362
2001	8392	121	1.40%	333	222	257	8750	358
2002	8505	113	1.33%	337				
Average	**7920.38**	**120.75**	**1.54%**	**344.27**	**253.33**	**164.5**	**8251.09**	**305.27**

(1) Number licensed from North Dakota Board of Nursing Annual Report years 1990-2002.

(2) Net gain is the number of nurses gained by subtracting the current year from the previous year.

(3) Net gain % is the percentage of the number licensed that the net gain represents.

(4) Number of new graduates from North Dakota Board of Nursing Education Report years 1992-2002

(5) New license by exam is the number of licenses that were issued to nurses taking the NCLEX examination and is from North Dakota Board of Nursing Annual Report years 1990-2002

(6) New license by endorsement is the number of licenses that were issued to nurses by endorsement and is from North Dakota Board of Nursing Annual Report years 1990-2002

(7) Predicted total is the number of licensed nurses from the previous year plus nurses licensed by endorsement and by examination.

(8) Number of lapsed licenses is estimated by subtracting the predicted total of nurses for a given year from the actual number of nurses.

Table 2: Computations for RN Workforce Projections

Number of Nurses by Age Controlling for Loss due to Leaving Direct Care

Year	Age Ranges 20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	Raw Total (3)
2003(1)	266	766	837	940	1362	1664	1175	653	349	181	78	8271
2008(2)		266	743	812	902	1294	1498	975	470	269	243	7472
2013(2)			258	721	780	857	1165	1243	655	362	481	6522

		Losses to Workforce			Gains to Workforce	
Year	Raw Total	Not Employed in Nursing (4)	Not in Direct Care (5)	Lapsed Licenses(6)	New Licenses(7)	Estimated Total RNs
2003	8271	-662	-1646			**5963**
2008	7472	-598	-1487	-1525	2090	**5952**
2013	6522	-522	-1298	-1525	2090	**5267**

(1) Number of nurses in each age range and raw total determined from North Dakota Board of Nursing Licensure Data obtained May 28, 2003.

(2) Nurses in each age range for 2008 and 2013 assuming an increase in five years of age and adjusted by those planning to leave direct care. Number of nurses planning to leave direct care is based on the percentage of nurses in the North Dakota Nursing Needs Study: Licensed Nurse Survey (2003) in nurses indicated how many more years they plan to provide direct care.

	2008	2013
3% 30-34	23	8
3% 35-39	25	22
4% 40-44	38	32
5% 45-49	68	45
10% 50-54	166	129
17% 55-59	200	255
28% 60-64	183	273
23% 65-69	80	108
6% 70+	16	31
Total	**799**	**903**

(3) Raw total is the sum of nurses across all age ranges for each year minus those planning to leave direct care.

(4) Number of nurses not employed in nursing is 8% of raw total. 8% was the percentage of RNs not employed in nursing found in the North Dakota Nursing Needs Study: Licensed Nurse Survey (2003).

(5) Number of nurses not in direct patient care is 19.90% of raw total. This percentage was the number of RNs in nursing that do not provide direct patient care in the North Dakota Nursing Needs Study: Licensed Nurse Survey (2003).

(6) Lapsed licenses is the average lapsed licenses from table 1 multiplied by five years.

(7) New licenses is the average number of new licenses by exam and endorsement from table 1 multiplied by 5 years.

Table 3: LPN Data Needed for Supply Projections

Year	Total # Licensed[1]	Net Gain #[2]	Net Gain %[3]	# New Graduates[4]	New License by Exam[5]	New License by Endorsement[6]	Predicted Total[7]	# of Lapsed Licenses[8]
1990	2981				63	38		
1991	2901	-80	-2.80%		57	47	3085	184
1992	2977	76	2.60%	84	93	37	3031	54
1993	3021	44	1.50%	125	113	20	3110	89
1994	3019	-2	0.07%	151	89	17	3127	108
1995	3047	28	0.92%	144	116	20	3155	108
1996	3115	68	2.20%	123	124	28	3199	84
1997	3162	47	1.50%	141	118	24	3257	95
1998	3197	35	1.10%	179	158	19	3339	142
1999	3193	-4	-0.13%	199	116	18	3331	138
2000	3200	7	0.22%	167	161	20	3374	174
2001	3179	-21	-0.66%	140	130	61	3391	212
2002	3244	65	2.00%	199				
Average	**3095.08**	**21.92**	**0.71%**	**150.18**	**111.5**	**29.08**	**3218.09**	**126.18**

(1) Number licensed from North Dakota Board of Nursing Annual Report years 1990-2002.

(2) Net gain is the number of nurses gained by subtracting the current year from the previous year.

(3) Net gain % is the percentage of the number licensed that the net gain represents.

(4) Number of new graduates from North Dakota Board of Nursing Education Report years 1992-2002.

(5) New license by exam is the number of licenses that were issued to nurses taking the NCLEX examination and is from North Dakota Board of Nursing Annual Report years 1990-2002

(6) New license by endorsement is the number of licenses that were issued to nurses by endorsement and is from North Dakota Board of Nursing Annual Report years 1990-2002

(7) Predicted total is the number of licensed nurses from the previous year plus nurses licensed by endorsement and by examination.

(8) Number of lapsed licenses is estimated by subtracting the predicted total of nurses for a given year from the actual number of nurses.

Table 4: Computations Needed for LPN Workforce Projections

Number of Nurses by Age Controlling for Loss due to Leaving Direct Care

Year	Age Ranges 20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	Raw Total (3)
2003(1)	223	282	260	311	528	566	475	291	139	46	17	3138
2008(2)		223	279	255	302	507	532	394	221	90	57	2860
2013(2)			221	273	247	290	477	442	299	144	134	2527

		Losses to Workforce			Gains to Workforce	
Year	Raw Total	Not Employed in Nursing (4)	Not in Direct Care (5)	Lapsed Licenses(6)	New Licenses(7)	Estimated Total LPNs
2003	3138	-188	-511			**2439**
2008	2860	-172	-466	-630	705	**2297**
2013	2527	-152	-412	-630	705	**2038**

(1) Number of nurses in each age range and raw total determined from North Dakota Board of Nursing Licensure Data obtained May 28, 2003.

(2) Nurses in each age range for 2008 and 2013 assuming an increase in five years of age and adjusted by those nurses planning to leave direct care. Number of nurses planning to leave direct care is based on the percentage of nurses in the North Dakota Nursing Needs Study: Licensed Nurse Survey (2003) in nurses indicated how many more years they plan to provide direct care.

	2008	2013
1% 30-34	3	2
2% 35-39	5	6
3% 40-44	9	8
4% 45-49	21	12
6% 50-54	34	30
17% 55-59	81	90
24% 60-64	70	95
35% 65-69	49	77
9% 70+	6	13
Total	**278**	**333**

(3) Raw total is the sum of nurses across all age ranges for each year.

(4) Number of nurses not employed in nursing is 6% of raw total. 6% was the percentage of nurses not employed in nursing found in the North Dakota Nursing Needs Study: Licensed Nurse Survey (2003).

(5) Number of nurses not in direct patient care is 16.3% of raw total. This percentage was the number of LPNs in nursing that do not provide direct patient care in the North Dakota Nursing Needs Study: Licensed Nurse Survey (2003).

(6) Lapsed licenses is the average lapsed licenses from table 3 multiplied by five years.

(7) New licenses is the average number of new licenses by exam and endorsement from table 3 multiplied by 5 years.