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A Commentary on Considering Recent Trends in Health Care Labor Markets in Educational Program Planning in Allied Health

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1 **Abstract**

2 Recent trends in wages and employment should be considered more often to help inform
3 recruitment and expansion planning for educational programs related to training the future health
4 care workforce. We present a relatively straight forward method for summarizing and assessing a
5 broad set of relative health labor market trends from 2010 to 2014 based on the number
6 employed and wage rates across all health care related occupational categories available from the
7 Occupational Employment Statistics (OES) data. To focus more specifically on trends within the
8 health care sector we use the relative wages and employment of the occupations compared to
9 Medical Doctors.

10 Of 19 broad occupational categories from OES, Pharmacists, Physician Assistants, and
11 Occupational and Physical Therapists have been experiencing a growth in demand relative to
12 Medical Doctors as evidenced by a growth in relative wages and relative employment. There is
13 also clear evidence of a reduction in the relative supply of allied health workers as a group
14 relative to Medical Doctors. Specifically, across all Allied healthcare workers there was an
15 increase in relative wages (2.28%) and a decline in relative employment (-3.64%). Occupations
16 with strong increases in wages and number employed are likely to be good areas for programs to
17 expand both in terms of the future economic welfare of their graduates and to help meet market
18 demand.

19 **Background**

20 The provision of health care services in the US remains labor intensive and increasingly
21 incorporates a multidisciplinary approach. Recent general health workforce evaluations maintain
22 that an insufficient supply of health care providers continues to be a major concern in US, though
23 it was somewhat abated by the recession in 2007.(1) Further, shortages of some health care
24 providers may worsen as the economy continues to recover, the population continues to age, and
25 as the Affordable Care Act (ACA) increases the number of insurance beneficiaries.(2-4)
26 Consequently, recruitment and training of future health professionals remains vital. Further,
27 while there are several factors that should go into planning for training health professionals,
28 recent trends in wages and employment are important considerations and generally underutilized.

29 This is especially true for allied health. In general, the health workforce literature focuses
30 on primary care, where recent studies demonstrate an increase in demand for primary health care
31 professions including physicians, nurses, and physician assistants in the US.(5-11) According to
32 several available projections, at its current pace the US postsecondary education system training
33 these groups of health professionals will not be able to meet expected increases in demand over
34 the next few years.(5, 6, 12) However, the majority of allied health care occupations tracked by
35 United States Bureau of Labor Statistics (BLS), have not received much attention and their status
36 in terms of demand versus supply is largely unreported. Meanwhile, these occupations comprise
37 about 60% of US healthcare labor force.(2, 13) We present an easy to adopt strategy for
38 examining wage and employment trends. In examining the data we also provide a novel
39 summary of trends in wages and numbers employed across health care related occupations
40 relative to Medical Doctors that have not been investigated in previous studies. For the purposes
41 of this general commentary we include the broadest possible set of occupations and select the

42 group of occupations associated with Medical Doctors as a general control. Using relative wages
43 serves as a crude control for general trends in inflation and other national level factors impacting
44 broad sets of wages that likely would not be related to selecting to train in one profession versus
45 another. Training programs related to a smaller set of occupations could focus in more detail on
46 a smaller set of occupations from the same data.

47

48 **Framework and Methods for Considering Market Trends**

49 Based on a standard microeconomic model of relative wage determination in a labor
50 market, professionals experiencing growth in relative employment and relative wages over 5
51 years, here relative to Medical Doctors, can be considered as ‘In Demand Jobs’, meaning
52 relative demand growth has been outpacing any changes in the relative supply(see Figure 1).
53 Conversely, ‘Jobs in Decreasing Demand’ can be identified based on declines in both the relative
54 number employed and in relative wages over time (Figure 1).Though not illustrated specifically
55 in Figure 1, in the same basic supply and demand model, relative wage growth combined with
56 reductions in relative employment are evidence of a (net of demand) decrease in supply and
57 decreasing relative wages along with an increase in relative employment indicates a relatively
58 rapidly expanding supply.

59 Given this general framework, recent national trends in numbers employed and in wage
60 rates for all available health professions relative to those of Medical Doctors are presented using
61 the US Occupational Employment Statistics (OES) data obtained online from the BLS
62 Databases. These wage and employment data are collected by the Quarterly Census of
63 Employment and Wages and include 800 standard occupations and are freely available.(14-16)
64 Here all job categories whose occupational codes (OCC code) beginning with '29: Healthcare

65 Practitioners and Technical Occupations' or '31: Healthcare Support Occupations' were
66 included, and other health care related occupations not covered by those OCC groups including
67 psychologists, medical secretaries, counselors and community health workers in the data were
68 also selected based on more detailed coding. The total number employed and annual average
69 wages by detailed job category were extracted and 5 year percentage changes (from 2010
70 throughout 2014) were calculated. New occupational categories from 2011 through 2014 were
71 merged into the corresponding broader categories that were used in 2010. In these cases, changes
72 in the number employed and weighted average wages were estimated for the merged class.
73 Wages were expressed in 2014 US dollars and were inflated from prior years using the
74 Consumer Price Index for all urban consumers (CPI-U).

75 We also provide some trends in groups of occupations across broad sets of services
76 based on OCC codes, OCC titles and occupational profiles. Again, as the primary reference point
77 here, detailed occupations requiring a Doctor of Medicine (See Table 1) were merged into the
78 medical doctors group (MDs). Occupational categories likely involved in independent clinical
79 decision-making, and/or with full or partial prescription authorization, or that deliver healthcare
80 directly to patients under the supervision of MDs were grouped in the category of primary
81 practitioners (See Table 1). All other healthcare occupations that had not been classified as MDs
82 or primary practitioners were broadly defined as allied healthcare occupations and grouped into
83 subclasses again on the basis of the typical services each occupational group delivers (Table 1).
84 Occupational titles associated with specialization in providing technical support in a specific
85 diagnostic area, specifically any occupational category with an OCC code beginning with 29-2,
86 but who are not typically authorized to make independent clinical decision were put in the
87 technician or technologist group. In addition, therapy assistants or aides who are typically not

88 specialized in a diagnostic technology were grouped into the supporting occupations. Finally,
 89 therapists, counselors, and social workers were respectively grouped based on detailed OCC
 90 titles. For the merged and broader categories, the number employed was the sum of the
 91 workforce of every detailed category, and annual wages represented the weighted average annual
 92 wage where the weights were the number employed that year in each of the detailed occupations.

93 Trends in real wages and the numbers employed for each specific and grouped set of
 94 occupation were calculated using Equation 1 below. In order to project the relative supply and
 95 demand of allied healthcare professionals, changes in relative wages and relative employment
 96 between 2010 and 2014 were determined for the specific and grouped sets of occupations as
 97 defined in Equation 2 where relative statistics in each occupational category was determined by
 98 the statistics in each year divided by the number for the occupational title with Medical Doctors.

99

$$\% \text{ Change over 5 years} = \frac{\text{Statistic in 2014} - \text{Statistic in 2010}}{\text{Statistic in 2010}} \times 100 (\%) \quad \text{Equation 1}$$

% Change in Relative wage or employment

$$= \left(\frac{\text{Relative Statistic in 2014} - \text{Relative Statistic in 2010}}{\text{Relative Statistic in 2010}} \right) \times 100 (\%) \quad \text{Equation 2}$$

100 Based on the supply and demand model discussed above and in Figure 1, occupational
 101 groups were plotted into four quadrants with the Y axis plotting positive or negative trends in
 102 relative wages between 2010 and 2014 and the X axis plotting positive or negative trends in
 103 relative employment. Each of the four quadrants is implicitly related to recent trends in the
 104 relative supply and demand that each occupational category has experienced as follows: (1) the

105 northeast quadrant is evidence that an increase in the relative demand outpaced any increase in
106 the relative supply; (2) the northwest quadrant indicates the relative supply stagnated behind any
107 changes in relative demand; (3) the southwest quadrant is associated with a decrease in relative
108 demand outpacing any drop in relative supply; (4) the southeast quadrant indicated the increase
109 in the relative supply outpacing any increases in the relative demand.

110

111 **Recent Market Trends**

112 As noted in Table 1, a total of 93 occupations were categorized into 19 groups, and wage
113 rates and labor quantities of each merged occupational category were listed. A broader set of 6
114 groupings was also used to show general trends in employment and in wages between 2010 and
115 2014. The total number of employed health care workers increased over the study period in each
116 of the five broadest categories although the growth overall (4.01%) was smaller than the overall
117 average across all US occupational categories (6.32%). In addition, a decrease was seen in the
118 average wage rates of each of the broad health care occupational groups though overall the
119 decline in wages was smaller in health occupations (0.78%) than in all occupations (2.04%).
120 Table 1 shows changes across time in absolute terms as well as changes in relative wages and
121 employment. Changes across time in real wages and the number employed of allied healthcare
122 providers were -1.08% and 3.04%, which were notably smaller than the changes for MDs (-
123 3.29% and 6.93%). The overall changes in the wages and number employed of primary care
124 providers other than MDs (-1.01% and 5.59%) were also less than those of MDs.

125 Using MDs as a reference point, allied healthcare providers experienced a 2.29% increase
126 in relative wages and a 3.64% decrease in relative employment. The relative changes of wages
127 and number employed for the primary care provider group compared to MDs' were 2.36% and -

128 1.26%, respectively (see Table 1). Change in relative wages and employment across broad sets
129 of occupations are also plotted in Figure 2.

130 Figure 3 plots trends in the 19 detailed occupational categories relative to Medical
131 Doctors. Of primary healthcare providers, pharmacists, registered nurses and physician
132 assistants, were located in the northeast quadrant. The number of employed licensed practical
133 nurses decreased but they did not experience notable change in relative wages. The relative
134 number of employed dentists increased though their relative annual wage dropped over the study
135 period suggesting an increase in relative supply.

136 Meanwhile, many of the specific allied healthcare occupations tended to show signs of
137 demand exceeding supply relative to Medical Doctors. The majority of the allied healthcare
138 occupations (9 out of 12 categories) saw an increase in their relative annual wage. Of them, all
139 three therapist groups (occupational therapists, physical therapists, and other therapists), as well
140 as pharmacy technicians, and occupational health specialists also experienced a relative increase
141 in the number employed, which is evidence of an increase in the relative demand that outpaced
142 any changes in the relative supply. Social workers, emergency medical technicians or
143 paramedics, assistants not classified elsewhere, and technicians not classified elsewhere
144 experienced an increase in relative wage and a decrease in relative employment, which is
145 consistent with a backward shift in supply relative to medical doctors. In addition, declines in
146 both the relative annual wages and the numbers employed of nursing aides and counselors were
147 observed, which is consistent with a reduction in relative demand.

148

149

150

151 **Discussion**

152 We believe the framework presented here provides a useful snapshot for setting targets in
153 workforce training programs. In general, over the past five years, a period of economic
154 recovery, there was a notable increase in the number of employed workers in health care related
155 occupations. At the same time there were general declines in the level of wages. Several
156 interesting trends were observed in the relative wages and number employed of various health
157 occupations relative to Medical Doctors. Physician Assistants demonstrated a particularly large
158 positive shift in relative demand between 2010 and 2014 as evidenced by large growth in both
159 wages and employment relative to Medical Doctors.

160 A shortage of primary health care providers in the US and corresponding
161 recommendations for expansion of training programs to supply more primary care providers
162 have been described in general analyses conducted in 2009 and 2010.(12, 17) In considering the
163 utilization of supporting health care occupations in the primary care setting, conversely, a recent
164 workforce analysis projected that the national supply of primary care physicians can come close
165 to meeting the national demand by 2020.(9) The results from our analysis, indicating a surge in
166 the number of employed physicians coupled with slightly declining wages is tentatively aligned
167 with the latter primary care workforce projections which provides some validation of our
168 analysis.(9)

169 Relative shifts in the occupational groups can and should help inform strategy for for
170 training initiatives. For example, supply appears to be lagging relative to Medical Doctors in
171 Social Workers and in Other Supporting Occupations which is tending to increase the wages of
172 those groups. There seems to be a decrease in demand for counselors and nursing aides, and an
173 increase in demand for several major allied health occupations including occupational and

174 physical therapists. Growth in relative demand for particular groups suggests areas where related
175 training programs may want to look at expansion. In addition, where there has been a decrease
176 in supply, there may need to be broader strategies to promote entry into those professions, and
177 rising wages should help provide incentive to potential recruitment.

178 The demand for allied healthcare professions is being fueled in part by a desire to
179 substitute more across occupations and as the disciplinary boundary of each profession becomes
180 less distinct.(18) Further, the ACA requires a varied workforce to be included in the scope of
181 healthcare delivery in order to increase healthcare access to a larger population.(19) With regard
182 to these increasing demands, the extent of primary care service provided by non-physician
183 healthcare workers is expected to increase from 23% in 2010 to 28% in 2020.(9)

184 Increasing health care needs of the US population combined with an upsurge in the
185 number of beneficiaries requires expansion in post-secondary medical education. However, our
186 results along with previous studies suggest that the US needs to target expansion of training
187 programs informed by anticipated changes in demand. Training to improve workforce supply
188 should keep in mind the potential for substitution across occupational categories. In addition,
189 educational programs for the non-clinical workforce and supporting occupations are going to be
190 a crucial area for additional research related to health care training and health service delivery.

191 This framework has several limitations. First, not all licensed or trained workers are
192 clinically active, which is not captured in BLS data. Therefore, there may be a sizable gap
193 between the number of employed workers and the number of licensed health care providers,
194 which is important to consider for planning related to specific postsecondary educational
195 programs. However, trends in wages and employment rising over time do suggest that future
196 returns to education in health care are likely to be high. That said, a second limitation is that

197 future trends may not persist. Aspects of labor markets that are particularly hard to predict
198 include the impact of future policy towards reimbursement of services as well as the potential
199 impact of technological advances in health services delivery. A third consideration is that our
200 estimates are based on labor market outcomes that may not be aligned with the actual underlying
201 “need” or optimal long run level of services for a particular population. Clearly training
202 initiatives in health services should broadly consider what is best for the community they
203 ultimately serve. Here though it is still worth knowing if wages are falling as that might
204 necessitate greater efforts at recruitment. Fourth, different health professionals may compete
205 against each other in the future more than they have in the past five years, which may expedite
206 substitution across different occupations. Finally, some of the trends seen in wages may reflect
207 compositional changes in the workforce such as in average experience levels. However, the time
208 period covered is relatively brief which limits the potential for compositional effects.

209 We maintain that the framework presented here can be useful to planners to briefly and
210 broadly assess market trends across a wide variety of occupations that make up the current health
211 care workforce for which there is generally little published information. Overall, our findings
212 from recent years illustrate suggestive trends in labor market outcomes for a variety of allied
213 healthcare professionals relative to medical doctors in the US. Several healthcare providers,
214 particularly, pharmacists, physician assistants and supporting healthcare workers have been
215 experiencing a growth in demand outpacing current supply relative to physicians. These findings
216 should provide a useful reference for strategic planning related to postsecondary educational
217 programs. In particular, programs related to occupations where demand has clearly been
218 outpacing supply should consider expansion.

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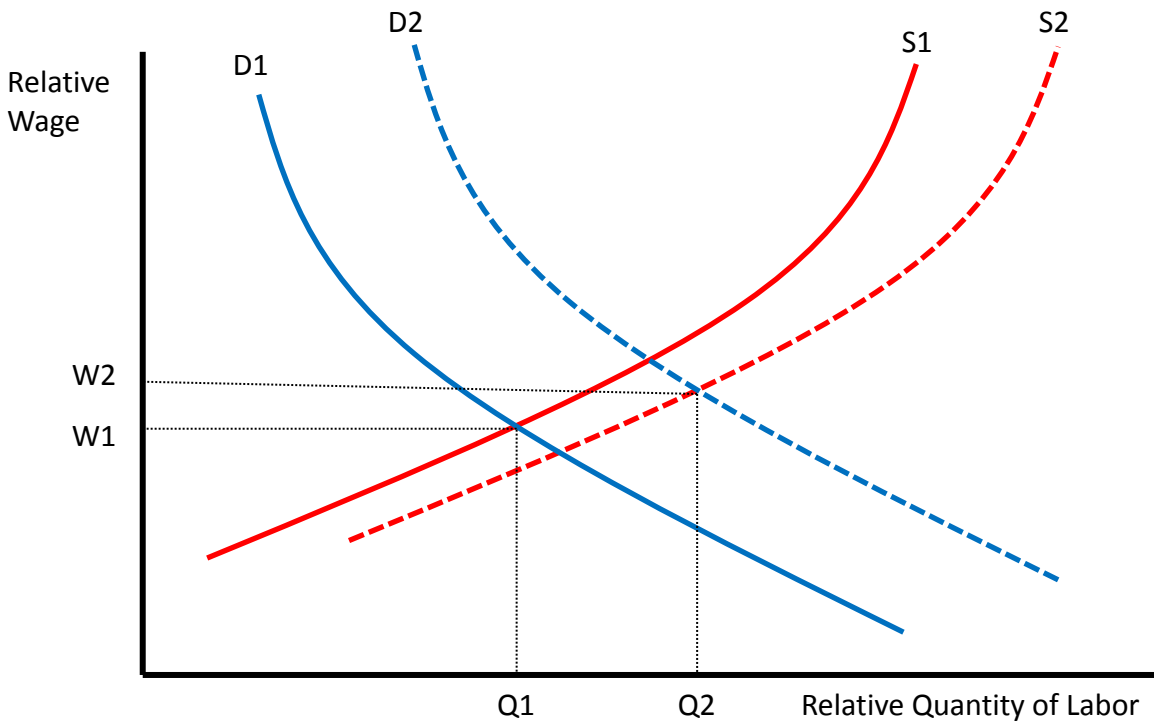


Figure 1. Jobs in demand and not in demand states defined by shifting relative supply and relative demand

Note. Both the relative quantity of health care providers employed and their relative wages increase when the growth of demand exceeds the market supply growth (i.e., from [Q1, W1] to [Q2, W2]). A decrease in demand outpacing a decrease in supply is implied by a drop in both relative wages and employment (i.e., from [Q2, W2] to [Q1, W1])

Abbreviations: Q, quantity of labor at equilibrium point; W, wage rate at equilibrium point; S, market health care provider supply curve; D, market health care provider demand curve

Table 1 Five-year changes in wages and the number employed in the health care workforce

	The number employed				Annual Wage (US \$)			
	2010	2014	Change (%)	Relative Change† (%)	2010	2014	Real Change (%)	Relative Change† (%)
All Occupations	127,097,160	135,128,260	+6.32	N/A	44,410	43,503	-2.04	N/A
All Healthcare related Occupations	13,132,080	13,659,010	+4.01	N/A	54,109	53,598	-0.78	N/A
Primary Practitioners	4,704,070	4,974,940	+5.76	N/A	83,853	82,631	-1.46	N/A
Medical Doctors (MDs)	592,410	633,480	+6.93	0	185,709	179,604	-3.29	0
Primary Practitioners other than MDs (Broad)	4,111,660	4,341,460	+5.59	-1.26	69,177	68,481	-1.01	+2.36
Dentists	104,290	115,390	+10.64	+3.35	163,862	157,452	-3.91	-0.65
Pharmacists	268,030	290,780	+8.49	+1.43	109,380	109,122	-0.24	+3.06
Registered Nurses (RNs)	2,655,020	2,851,060	+7.38	+0.42	67,720	66,495	-1.81	+1.51
Physician Assistants (PAs)	81,420	91,670	+12.59	+5.02	87,140	89,604	+2.83	+5.95
Licensed Practical / Vocational Nurses (LPNs)	730,290	695,610	-4.75	-12.26	41,360	39,994	-3.3	-0.02
Other Diagnosing and Treating Practitioners	272,610	296,950	+8.93	+1.83	76,777	73,397	-4.4	-1.17
Allied Health Workers (Other than PA and LPN)	8,428,010	8,684,070	+3.04	-3.64	37,507	37,103	-1.08	+2.29
Assistants, Supporting Occupations (Broad)	4,608,480	4,623,300	+0.32	-6.18	29,598	29,312	-0.94	+2.43
Dental Hygienists	177,520	196,520	+10.70	+3.41	68,680	66,291	-3.48	-0.20
Occupational Health and Safety Specialists	54,680	65,130	+19.11	+10.22	65,610	64,909	-1.07	+2.24
Nursing Aides, Orderlies, and Attendants	1,451,090	1,480,160	+2.00	-4.83	25,140	24,192	-3.77	-0.50
Assistants, Supporting Occupations, Other	292,510	288,190	-1.49	-8.55	28,765	28,629	-0.47	+2.83
Technicians, Technologists (Broad)	1,816,490	1,947,570	+7.22	+0.27	41,427	40,388	-2.51	+0.81
Emergency Medical Technicians and Paramedics	221,760	235,760	+6.31	-0.58	33,300	32,340	-2.88	+0.42
Pharmacy Technicians	333,500	368,760	+10.57	+3.29	29,330	28,637	-2.36	+0.95
Technicians, Other	1,261,230	1,343,050	+6.49	-0.42	46,055	45,028	-2.23	+1.08
Therapists (Broad)	616,010	697,530	13.23	+5.89	66,080	64,744	-2.02	+1.31
Occupational Therapists	100,300	110,520	+10.19	+2.96	73,380	73,687	+0.42	+3.69
Physical Therapists	180,280	200,670	+11.31	+3.93	77,990	77,317	-0.86	+2.45
Therapist, Other	335,430	386,340	+15.18	+7.16	57,495	55,656	-3.20	+0.09
Counselors	607,810	613,750	+0.98	-5.90	46,689	44,240	-5.24	-2.07

Social Workers	779,220	801,920	+2.91	-3.91	45,390	44,488	-1.99	+1.33
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Note

- †Relative Change: Changes in wage and workforce relative to those of the MDs.
- Medical Doctors includes anesthesiologists, general practitioners, internists, obstetricians, gynecologists, pediatricians, psychiatrists, surgeons, other physicians and surgeons.
- Dentists includes general dentists, oral and maxillofacial surgeons, orthodontists, prosthodontists and dentists with other specialties
- Registered Nurses included general registered nurses, nurse anesthetists, nurse midwives and nurse practitioners.
- Other Diagnosing and Treating Practitioners includes chiropractors, dietitians and nutritionists, optometrists, podiatrists, audiologists, psychologists and treating practitioners with other specialties.
- Nursing Aides, Orderlies, and Attendants includes nursing assistants and orderlies
- Assistants, Supporting Occupations, Other includes dental assistants, home health aides, psychiatric aides, occupational therapy assistants, occupational therapy aides, physical therapist assistants, physical therapist aides, medical assistants, medical equipment preparers, medical transcriptionists, pharmacy aides, phlebotomists, medical secretaries, medical equipment repairers, athletic trainers and healthcare support workers with other specialties.
- Technicians, Other includes laboratory technologists, laboratory technicians, cardiovascular technologists and technicians, diagnostic medical sonographers, nuclear medicine technologists, radiologic technologists, magnetic resonance imaging technologists, dietetic technicians, psychiatric technicians, respiratory therapy technicians, surgical technologists, ophthalmic medical technicians, medical records and health information technicians, dispensing opticians, orthotists and prosthetists, hearing aid specialists, occupational health and safety technicians, genetic counselors, health technologists and technicians with other specialties and all other healthcare practitioners and technical workers
- Therapist, Other includes radiation therapists, recreational therapists, respiratory therapists, speech-language pathologists, exercise physiologists, massage therapists and therapists with all other specialties
- Counselors includes substance abuse and behavioral disorder counselors, marriage and family therapists, mental health counselors, rehabilitation counselors and counselors with all other specialties
- Social Workers includes child/family/school social workers, healthcare social workers, mental health and substance abuse social workers, social workers with other specialties, health educators, community health workers, and community and social service specialists

5-year Trend in Relative Wage and the Relative Number Employed: Merged Broad Category

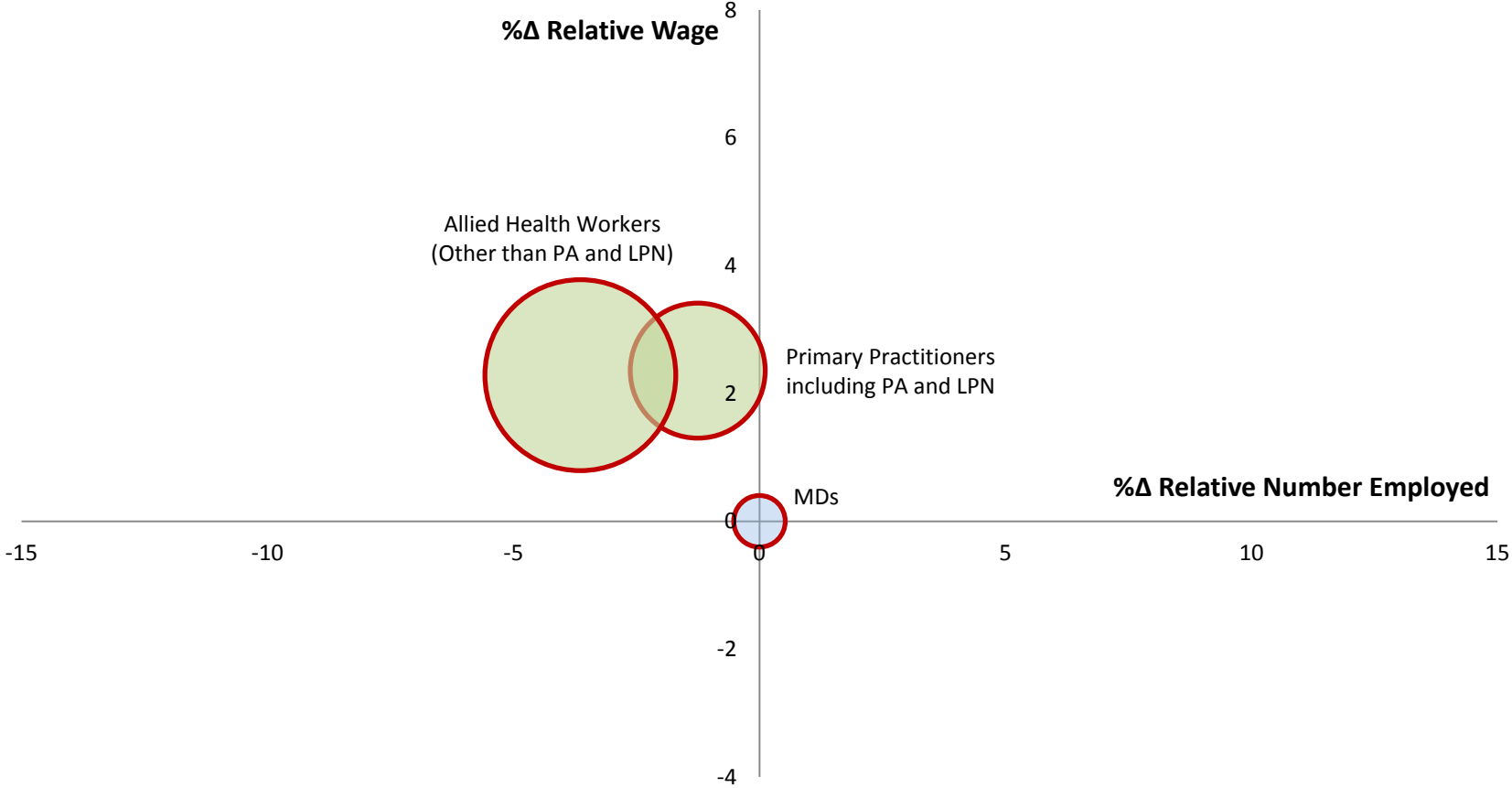


Figure 2. Five-year trends in percent change of aggregate wages and number employed for broad health care occupational groups relative to percent changes in wages and number employed for Medical Doctors.

5-year Trend in Relative Wage and the Relative Number Employed

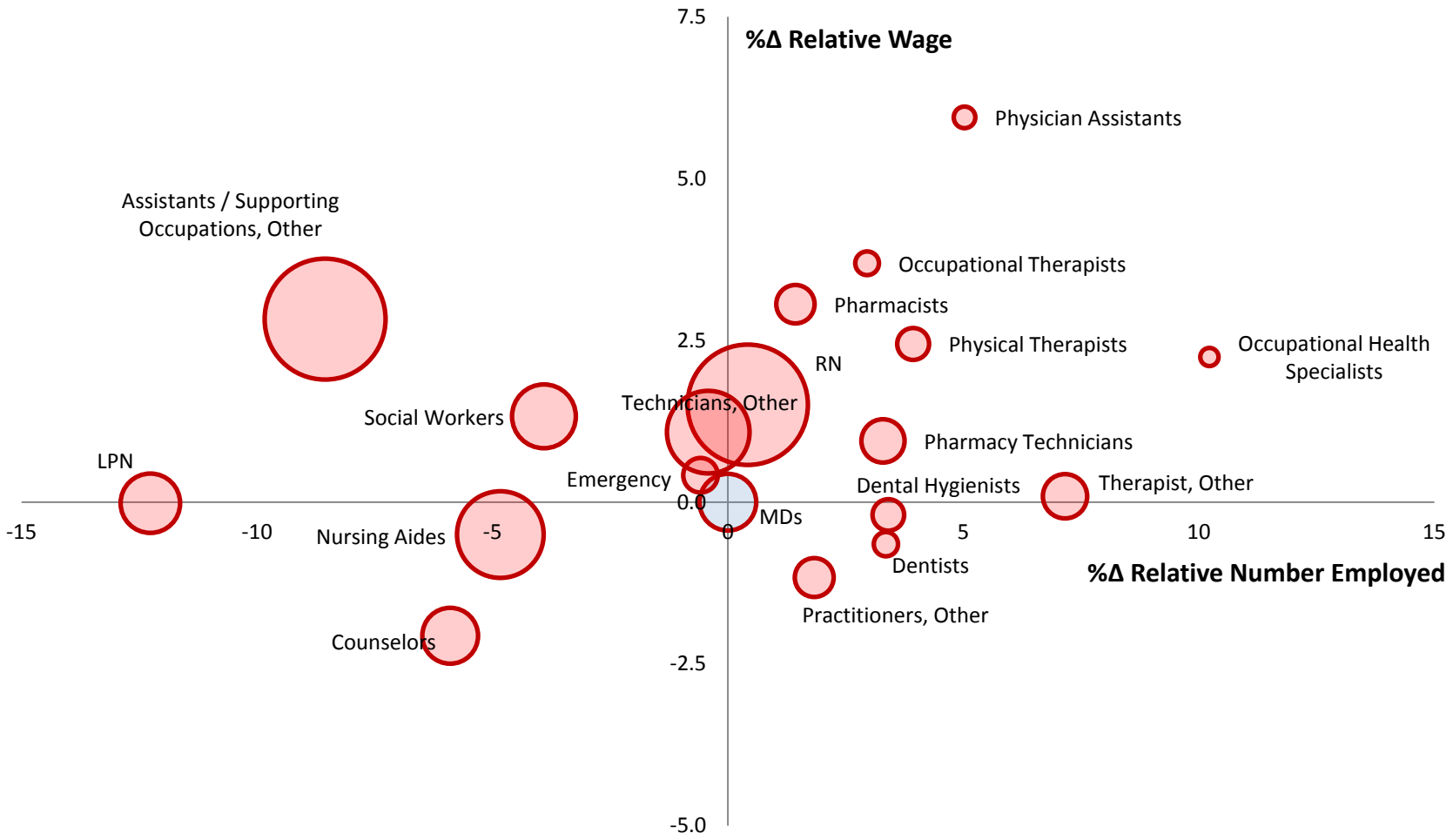


Figure 3. Percent change in annual wages and number employed across five years in detailed occupational categories relative to percent changes in wages and number employed for Medical Doctors