Primary Care Visits in the USA and Australia 2000–2016

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BACKGROUND: There are major concerns about the sustainability of the US primary care (PC) system.
OBJECTIVE: We use similar data from the USA and Australia on adult visits to primary care physicians to examine how primary care service delivery and content in the countries have changed since the year 2001.
DESIGN/SETTING/PARTICIPANTS: Longitudinal analyses of nationally representative data collected in a similar manner on outpatient visits to PC in the USA (National Ambulatory Medical Care Survey, NAMCS) and Australia (Bettering the Evaluation and Care of Health, BEACH), 2001–2016.
MAIN MEASURES: For each visit, we ascertained the problems/diagnoses managed; the length of the visit in minutes; what medications were recorded; whether counseling, advice, or education was provided; the rate of imaging and diagnostics tests; the laboratory tests ordered; and whether the visit resulted in a referral to another physician.
KEY RESULTS: Between 2001 and 2016, there were 128,770 encounters with adult patients in NAMCS and 1,338,963 in BEACH. In the USA, the proportion of encounters with 3 or more problems managed increased from 28.7 to 54.8% whereas Australia started at a lower proportion (10.6%) and increased to just 14.1%. Visit times in the USA increased from 17.2 min in 2001 to 22.9 min in 2016 as compared to 14.4 min increasing to 15.2 in Australia. There were significantly more medications recorded over time in NAMCS than BEACH (2.02 in 2001 to 3.32 in 2016, USA, and 1.10 and 1.04, Australia), and US encounters resulted in imaging studies, lab tests, or referrals with relatively increasing frequency.
CONCLUSION: Relative to Australia, PC visits in the USA increasingly entail more complexity with visits that have grown comparatively longer over time, with more problems addressed, and with more content.

KEY WORDS: primary care; ambulatory care; international comparisons.

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In the USA, there are major concerns about the sustainability of the primary care system.[1] Primary care physicians (PCPs) are being asked to provide more and more services, both within the context of a visit and during the interval between visits, yet payment rates have not kept up with those in other specialties or with increasing expenses associated with running a primary care practice.[2] The primary care physician workforce is aging,[1] with many approaching retirement age, and the numbers of graduating medical students entering primary care specialties continue to be insufficient to meet the needs of an aging population.[3]

Recent data suggests that US patients are accessing PCPs less frequently,[4] and the proportion of the population with an identified PCP is falling, particularly among younger and healthier populations.[5] In addition, many of these younger and healthier patients are choosing to access more convenient service delivery providers outside of the PCP relationship such as retail clinics or telemedicine for relatively simple or straightforward problems.[6] As a consequence, the remaining visits delivered by PCPs in the USA may be becoming ever more complex as simple-to-address visits are siphoned off, thus leaving a higher proportion of care delivered to older patients and those with multiple chronic conditions.

An important question to understand is the extent to which these trends are universal and resulting from advances in both medical knowledge and technology (e.g., new medications, testing modalities, screening recommendations, etc.), or whether they are artifacts of the US insurance and payment systems, which frequently entails substantial out-of-pocket expenses for accessing physicians. For instance, increasing numbers of those covered by commercial insurance are enrolling in high-deductible health plans, which may not exempt primary care services from the deductible.[7] One way to address this question is to examine how primary care service delivery has evolved in other health care systems. Despite some differences in population characteristics, Australia represents an interesting comparison. In Australia, the vast majority of primary care services are provided by general practitioners (GPs). Like most insurance coverage in the USA, Australians are free to choose to go to any GP and they are not required to identify a single GP with jurisdiction over their care.[8] Australian GPs also receive fee-for-service (FFS) payments that are visit based, which are funded through the Medicare Benefits Schedule under Australia's universal

Medicare program, which applies to all Australians, though some also charge additional fees that must be paid out of pocket. And, similar to the USA, primary care fees in Australia have not kept up with inflation.[9] Most Australian GPs work in private practice settings, and like in the USA, Australian PCPs largely had been using or adopted electronic health records over this time period.[10] Finally, Australia also faces primary care workforce challenges similar to the USA.[8, 11] We therefore use similar data from the USA and Australia on adult visits to primary care physicians to examine how primary care service delivery and content in the countries have changed since the year 2001.

METHODS

Primary Data Sources

USA. For the USA, we analyzed patient visits from the National Ambulatory Medical Care Survey (NAMCS) from 2001 through 2016. The NAMCS is an annual cross-sectional survey of ambulatory care visits in the USA, conducted by the National Center for Health Statistics (NCHS).[12] Designed to measure the provision and delivery of ambulatory care services, the NAMCS is nationally representative of outpatient visits to nonfederal, office-based physicians. Visits to advanced practice providers such as nurse practitioners and physicians' assistants are not included in the samples. The serial nature of the survey makes it ideally suited to track trends over time.

The NAMCS uses a multistage probability sample design. In the first stage, 112 geographically based primary sampling units are selected. In the second stage, practicing physicians, stratified by specialty, are selected within each sampling unit. Physicians are identified using master files maintained by the American Medical Association and American Osteopathic Association. In the third and final stage, patient visit data are collected from each selected physician during a randomly assigned 1-week reporting period. For these analyses, we restricted the sample to visits by adults 18 or older to primary care physicians, defined by NAMCS as family medicine, internal medicine, and geriatric medicine.

For each sampled visit, standardized forms are used to collect data on patient demographic characteristics, reasons for the encounter (chief complaint), diagnoses derived from the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) (ICD-10 was used for the 2016 survey), and medications prescribed at the visit. Both new and continuing medications are recorded.

Between 2003 and 2016, the average response rate among physicians was 53%. Adjustments are applied using survey weights to minimize the effect of nonresponse bias.[12] Item nonresponse rates were generally less than 5%; missing demographic data were imputed. Use of survey weights as outlined by the NCHS enables the calculation of national-level estimates and associated standard errors. Additional details for the NAMCS can be found in the NCHS website.[12] The Harvard Medical School Committee on Human Subjects has deemed analyses using NAMCS are exempt from review.

Australia. For Australia, we used annual data collected on a nationally representative sample of visits to GPs by the Bettering the Evaluation and Care of Health (BEACH) program collected between 2001 and 2016. BEACH data collected over the period April 2000 to March 2001 are referred to as 2001, 2001–2002 as 2002, and so on.[8] Every year, each of approximately 1000 randomly sampled GPs recorded the content of 100 consecutive GP–patient encounters on structured paper recording forms with consenting patients. Similar to NAMCS, the details collected include the patient's reason/s for the encounter,[8] problems managed, medications (prescribed, advised, or supplied), pathology or imaging tests ordered, referrals made, and any other clinical or procedural treatments provided. In contrast to NAMCS, all clinical management decisions that occur during the visit are directly linked to a specific problem being managed rather than the visit overall, but these can be aggregated in order to provide similar visit level data. BEACH codes data using the International Classification of Primary Care Version 2 PLUS, which automatically classifies data to ICPC 2.[8, 13]

BEACH data collection is evenly distributed throughout 50 weeks each year. GPs who claimed at least 375 general practice Medicare items of service in the previous quarter are eligible, and of the GPs who agree to participate, about 80% complete the project each year. For each year of data collection, weights were applied to the data to account for the difference in GP activity and for any minor difference in the age–sex distribution of GPs. The age–sex distribution of patients in the BEACH study has been repeatedly shown to accurately represent the age–sex distribution of patients at all encounters paid by Australia's Medicare.[8] BEACH has a single-stage cluster study design with the GP as the sampling unit and the GP–patient encounter as the unit of inference. With minimal missing data, the BEACH project does not use imputation.

The BEACH program is approved by the Human Research Ethics Committee of the University of Sydney.

Main Outcome Measures

Broadly, we were interested in describing how the demographic characteristics (e.g., age, sex) of adult patients (aged 18 years or older) being seen in primary care as well as the work and content entailed in visits to primary care physicians in the two countries evolved over the study time period. For each visit, we ascertained the problems/diagnoses managed; the length of the visit in minutes; what medications were recorded; whether counseling, advice, or education was provided; the rate of imaging and diagnostic tests; the laboratory tests ordered; and whether the visit resulted in a referral to

another physician. Details on the measures and how they were collected over time in each survey are summarized in Table 1.

Statistical Analysis

Both the BEACH and NAMCS datasets have a cluster sample study design. While the NAMCS study has several clusters, the most important cluster is that of the patient encounters around each physician, which was similar to the clustering used in the BEACH survey. We therefore controlled for clustering in each survey at the level of the physician only so that they could be compared using a similar analytic approach. Surveymeans procedures in SAS version 9.4 (SAS Institute Inc, Cary, NC) were used to adjust for this cluster to produce robust 95% CIs. Significant differences between point estimates are judged by non-overlapping 95% confidence intervals. This is a conservative estimate of significance compared with a traditional alpha of < 0.05.[14] Significant changes over time were determined using a regression analysis using survey procedures which also account for the cluster around each physician.

ROLE OF THE FUNDING SOURCE

This study was not funded externally. Dr. Harrison had full access to all study data and takes responsibility for its integrity and the accuracy of the analysis.

RESULTS

Overall Visit Characteristics

Between 2001 and 2016, there were 128,770 encounters with patients aged 18+ recorded in the NAMCS database (mean of 8048 per year) and 1,338,963 in the BEACH database (mean of 83,685 per year, Table 2). In both countries, female patients accounted for the majority of encounters (56.9% in NAMCS and 57.7% in BEACH 2016) and this did not change significantly across the time period of study (data not shown). In the USA, about one-third of encounters were for patients who were 65 years old or older, and this declined slightly across the study period (34.5% in 2001 and 31.9% in 2016). In contrast, in Australia, there was a significant increase from 27.6% in 2001 to 35.4% in 2016.

Table 1 Ascertainment of Measures in NAMCS and BEACH

Measure	NAMCS	BEACH	Study
# of diagnoses managed	• 2001–2013: up to 3 diagnoses • 2014–2016: up to 5 diagnoses	2001–2016: up to 4 diagnoses	Limit to 3 diagnoses to allow for consistent measurement over time and across countries
Diagnosis framework	ICD-9/ICD-10	ICPC-2	Mapped to a common framework using expanded diagnostic clusters using Ambulatory Care Groups software.
Medication use*	• 2001–2002: up to 6 medications • 2003–2011: up to 8 medications • 2012–2013: up to 10 medications • 2014–2016: up to 40 medications	2001–2016: up to 16 medications	Restricted to first 8 medications across all years. • % of visits with any medication • Mean number of medications
Counseling, advice, and education	2001–2016: • Diet/nutrition • Exercise • Tobacco • Mental health/psychotherapy • Stress	Available all years (any type of counseling)	% of visits for which any counseling recorded in NAMCS was offered
Imaging/diagnostic studies	All years: • X-rays • Mammogram • ECG 2007–2016: • MRI • CT • Echocardiogram • Ultrasound	Available all years	% of visits with at least one of the NAMCS imaging studies ordered limited to 2007–2016 to allow for consistency over time
Laboratory testing	2001–2006: not consistently recorded 2007–2016: • Cholesterol/lipids • Blood count • PSA • Pap smear • Glucose • Hb A1C	Available all years	% of visits with a NAMCS recorded lab test 2007–2016 to allow for consistency over time
Referrals	Referrals to another physician recorded in all years	Up to two referrals recorded in all years	% of visits with a referral (restricted to specialists for BEACH)

ICD International Classification of Disease, ICPC International Classification of Primary Care

**11.6% of NAMCS visits in 2001 had 6 medications recorded (suggesting that some of these patients may have had up to 8 medications) and 19.6% of NAMCS visits in 2016 had more than 8 medications listed; just .05% of BEACH visits in 2016 with 8 medications recorded (suggesting that the number of medications maybe underestimated in NAMCS in later years, but not in BEACH)*

Table 2 Sample Description

	2001–2016			
	NAMCS ***n***	**NAMCS (95% CIs)**	**BEACH** ***n***	**BEACH (95% CIs)**
Patient age				
18–24 years	7980	5.6% (5.3–5.8)	105,746	8.0% (7.9–8.1)
25–44 years	32,957	24.6% (24.0–25.2)	365,022	27.4% (27.1–27.6)
45–64 years	49,072	37.7% (37.2–38.2)	426,454	32.0% (31.9–32.2)
65–84 years	33,303	27.7% (27.0–28.4)	372,408	27.7% (27.5–28.0)
85+ years	5458	4.4% (4.2–4.6)	69,333	4.9% (4.8–5.0)
Mean age		*54.7 (54.4–55.1)*		*53.9 (53.8–54.1)*
Patient sex				
Male	53,198	41.7% (41.1–42.3)	521,594	41.8% (41.6–42.0)
Female	75,572	58.3% (57.7–58.9)	807,668	58.2% (58.0–58.4)
Total encounters	**128,770**		**1,338,963**	
Number of clinicians	**5803**		**15,677**	

In the USA, the proportion of encounters with 3 or more problems managed increased from 28.7 to 54.8% (90% increase), whereas Australia started at a much lower proportion (10.6%) and increased to just 14.1% (33% increase) over the study period (Fig. 1). Visit times in the USA reflected this complexity and increased from 17.2 min in 2001 to 22.9 min in 2016 (33% increase). In contrast, visit times started out shorter in Australia (14.4 min) and increased minimally to 15.2 min (5% increase), over the same period (Fig. 1).

Cardiovascular conditions were the most frequently managed problems in the USA across both periods, accounting for approximately one in five problems managed (~ 20% at both the beginning and end of the study period, Fig. 2). This was significantly more than in Australia (~ 12%). The most frequently managed problem in Australia related to administrative/preventive problems (14.1% and 15.7%), which includes preventive care (e.g., immunizations, physicals), medication renewals, wellness/sickness excuse letters, and discussion of test results, was significantly more common than in the USA across both periods (9.3% and 10.9%). Musculoskeletal problems accounted for just over 10% of visits in both countries. The USA had more visits related to endocrine (7.5% and 8.1% v. 3.8% and 4.8%) and respiratory issues (6.7% and 5.9% v. 4.3% and 4.0%) but fewer visits related to psychosocial (5.1% and 6.2% v. 8.4% and 9.1%) and dermatologic problems (4.3% and 3.4% v. 7.1% and 6.7%).

Visit Outcomes

Medication Use. There were significantly more medications recorded at NAMCS encounters than BEACH encounters across the study period. While the average number of medications recorded at BEACH encounters decreased by about 5% (1.10 in 2001 and 1.04 in 2016), the average number at NAMCS encounters increased by more than 50% from 2.02 in 2001 to 3.32 in 2016 (64%). Similarly, the proportion of encounters where at least one medication was recorded decreased in Australia (68.1% in 2001 to 63.0% in 2016) while increasing in the USA (73.7 to 85.9%) (Fig. 3).

Laboratory Testing and Imaging. The proportion of encounters where a selected pathology test was ordered was fairly stable in Australia (11.8 to 11.6%), whereas in the USA, it was significantly higher in 2016 than in 2007 (31.6 to 36.5%) (Appendix Figure 1). The proportion of US encounters where at least one imaging test was ordered did not significantly change from 2007 to 2016 (15.9 to 16.0%), but, while lower overall, the proportion increased in Australia over the same time period from 8.5 to 10.3% (Appendix Figure 1).

Counseling/Advice/Education. The proportion of encounters where counseling, advice or education was provided increased from 24.6 to 30.1% in the USA and decreased from 26.3 to 25.1% in Australia. However, neither of these changes were a consistent trend (Appendix Figure 2).

Referrals. The proportion of encounters that had a referral to a specialist increased across the study in the BEACH data from 7.7% in 2001 to 9.5% in 2016 whereas the proportion of encounters where a referral was made in the USA increased substantially more from 8.7% in 2001 to 16.0% in 2015 (though a dip to 12.2% in 2016 washed away some of the previous increase) (Appendix Figure 2).

DISCUSSION

In this cross-national comparison of changes in primary care delivery in two health care systems that primarily use fee-for-service reimbursement for primary care, we find notable differences in the delivery of primary care services at baseline as well as in how primary care has evolved over the 15-year study period. First, it is clear that primary care visits in the USA increasingly entail more complexity with longer visits that have grown comparatively longer over time, with more problems addressed, and with more content. US visits more frequently result in a referral and entail higher rates of provision of medications, testing, and counseling. Though a small portion of these differences might be related to the US

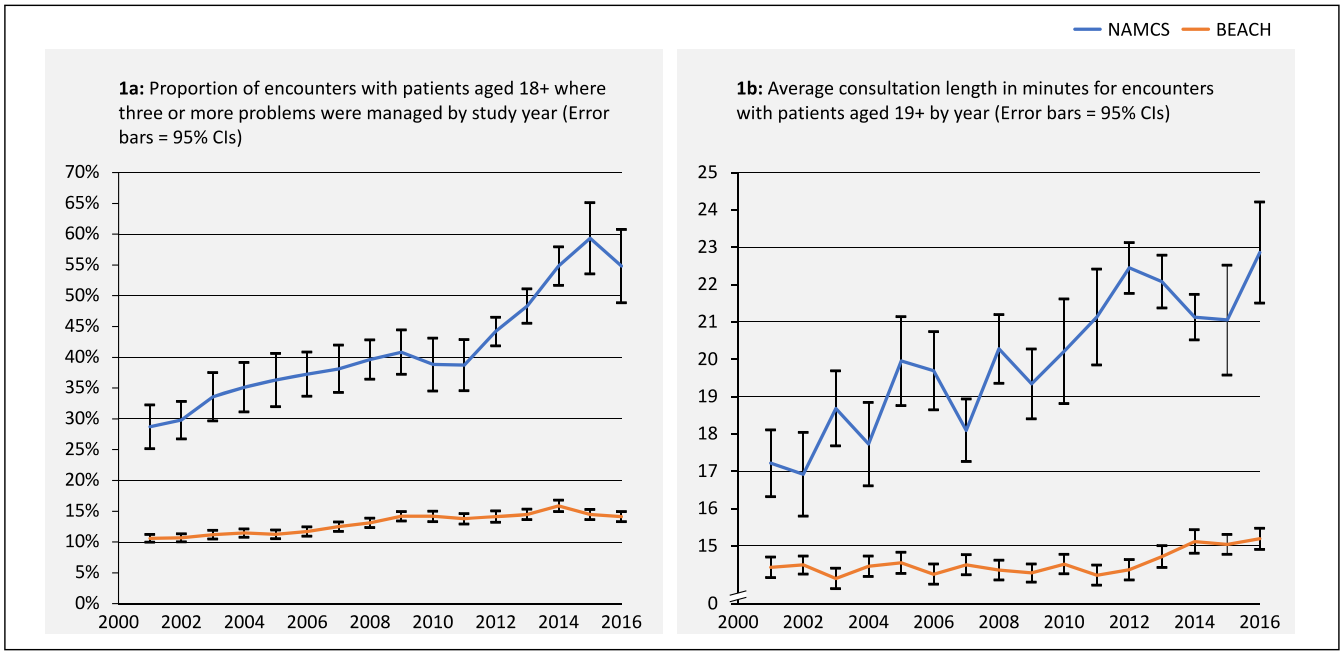

Figure 1 Consultation length and complexity. a Proportion of encounters with patients aged 18+ where three or more problems were managed by study year (error bars = 95% CIs). b Average consultation length in minutes for encounters with patients aged 19+ by year (error bars = 95% CIs).

population becoming relatively "sicker" over time, these findings suggest that the evolution of primary care provision in the two systems has as much or more to do with the financing and organization of primary care within each of the health systems than with changes in the epidemiology of disease, technology, or science that have impacted the delivery of health care services over this time period.

The relative increase in the complexity of visits in the USA is likely multifactorial. Though the proportion of visits for elderly patients was similar in the two countries by the end of the study period, rates of conditions such as obesity (42 v. 31%),[15, 16] diabetes (10% v. 5%),[17, 18] and hypertension (45.4 v. 34%)[19, 20] are much more common in the USA. Despite this, in 2016, the average Australian made 6 visits annually to GPs, with those over the age of 65 making over 10 visits.[8] In contrast, in the USA, the average number of visits was approximately 1.5 with those over the age of 65 making an average of 3 visits/year (including those who do not see any PCP, or 4.5 visits per year for those who have at least one primary care visit).[21, 22] Thus, it is unlikely that the differences

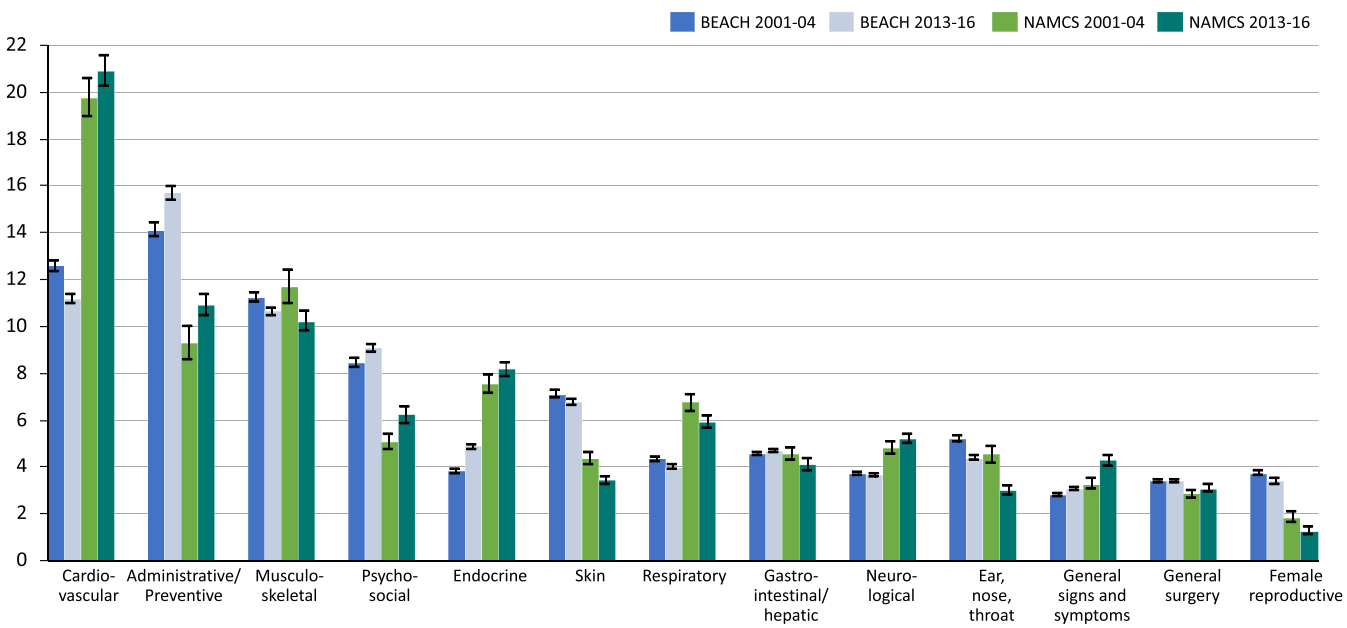

Figure 2 Distribution of most commonly managed problems at US and Australian PHP encounters: 2001–2004 and 2013–2016.

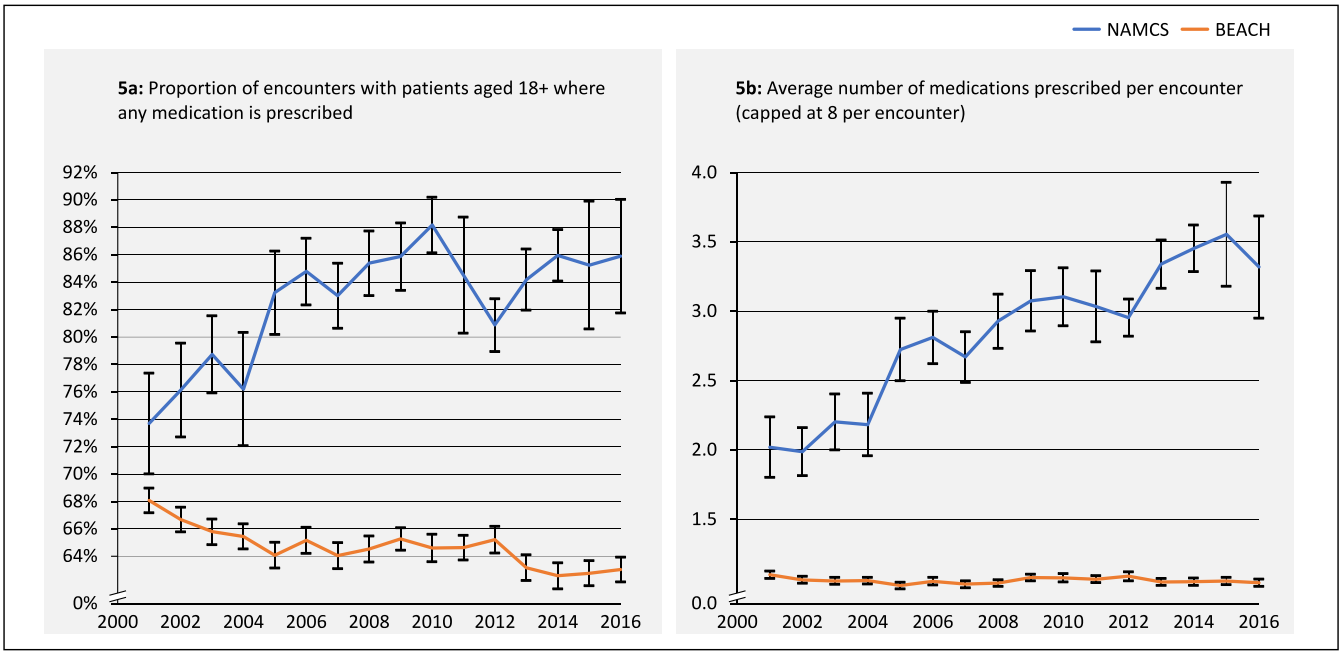

Figure 3 Prescription drug use.

we observed stem simply from differences in disease burden. Perhaps as a result of the lower number of visits, substantially more visits in the USA addressed multiple problems, involved laboratory or imaging tests, or resulted in a referral to another physician. In both the USA and Australia, intervisit care, which might include tracking and interpreting test results or conferring with specialist physicians does not receive additional compensation beyond typical visit-based payments and the substantial increases in both testing and referrals in the USA suggest that the burden of intervisit care likely has grown disproportionately in the USA.[2]

Differences over time also might relate to other underlying differences between the two healthcare systems that influence how primary care services are used. In Australia, over 80% of primary care services are "bulk billed," which means that the service is reimbursed at the full government fee schedule rate without requiring any out-of-pocket payments from patients; most of these visits are billed at the second-lowest consultation level. Thus, payment incentives in Australia favor provision of more frequent, but shorter and more focused visits, which is consistent with our observed results. In addition, Australian patients generally must see their GPs to renew prescriptions or obtain referrals to specialist physicians (each of which requires a "referral letter" to that specific physician) and similar services in the USA frequently are provided outside the context of a specific visit. In addition, Australia has not seen the proliferation of urgent care and other convenience care options that serve to siphon off low acuity visits from primary care in the USA.[23]

In contrast, US PCPs most commonly bill for medium or complex level visits (level 3 or level 4). Thus, US PCPs receive relatively higher payments for more complex visits than in Australia. In addition, though annual "preventive" visits generally are covered without a copayment, the vast majority of primary care visits require either a copayment or coinsurance (traditional Medicare requires a 20% coinsurance payment, for instance). As a result, because of these out-of-pocket fees, which have been growing over time, many patients seek to minimize visits to physicians and fit in more issues during typical visits. In addition, increasing numbers of working age Americans are now covered by high-deductible health plans that require patients to pay for the entire visit (and associated lab testing) out of pocket (often with the exception of a single preventive visit per year).[7] There also has been a proliferation of lower acuity urgent care settings that siphon off lower complexity visits from PCPs.[24]

Our analysis is subject to several limitations. First, there are changes in survey design and data collection procedures for the NAMCS from year to year, and, though similar, the BEACH survey differs in subtle ways from NAMCS. We sought to minimize some of these effects in the design of our study, for example, by consistently examining only the first eight medications listed in the survey. Including more medications, however, only would have exacerbated the growing differences we observed. Second, the NAMCS lacks detail on prescriptions and whether a medication was noted at the visit or was actually prescribed by the physician. To the extent that this biases NAMCS to recording more medications should not change over time, however. Third, both the NAMCS and BEACH are representative of visits, not patients. We are therefore unable to examine patient level provision of care. Fourth, BEACH concluded data collection in 2016, so we lack data on more recent years. We have no reason to believe, however, that the trends we observe would be substantially different. Fifth, there has been increasing focus on coding of disease in the USA over this time period, though given the

consistent increases in all aspects of visit complexity, it is unlikely that our results with respect to the number of conditions addressed were simply driven by coding-related changes. Finally, our US results are generalizable to nonfederal office-based physician practices so does not generalize to visits to physicians in hospital-based practices or to visits to advanced practice providers such as nurse practitioners or physicians' assistants. Nonetheless, we would expect similar trends in these settings.

Our findings have implications for policy makers when considering potential reforms to primary care payment or organization. Though making it easier for patients to see their PCPs more frequently seems like one potentially attractive lever, simply decreasing costs to patients is unlikely to be an adequate solution. Patients are increasingly busy and seek better and more convenient access to primary care on their own terms, and this certainly will continue to involve both synchronous and asynchronous remote access that does not require an in-person visit.[25, 26] Making permanent allowances for telemedicine that arose during COVID is certainly one important step, but other methods of access that are not reimbursed such as patient messaging and remote monitoring will also be increasingly used in the future. Creating new billing codes for these services is another potential lever, but this approach has largely been ineffective to date.[27] Consequently, these findings suggest an urgent need to consider alternative payment systems for primary care such as primary care capitation that better support the way that primary care services are provided in the USA.[28] The fee-for-service payment system is poorly suited to the tenets of providing first contact care that is comprehensive, coordinated, and continuous. Australian PCPs have adapted to this payment system by requiring visits for administrative tasks and addressing fewer complaints during the average visit. In contrast, US PCPs are increasingly delivering more care within typical visits, which invariably leads to increased levels of intervisit care as well. Though increased FFS payment rates also might be helpful, this does not solve the fundamental mismatch between the work done in primary care and the payment methods used to reimburse primary care.

In conclusion, in this longitudinal comparison of primary care delivery in the USA and Australia, both systems that primarily use fee-for-service reimbursement for primary care, we find that there are substantial differences in how the delivery of primary care services have evolved over the past decade and a half. Primary care visits in the USA entail more complexity with longer visits that have grown comparatively longer over time, with more problems addressed, and with more content, and also likely entail more intervisit care. These findings suggest that while fewer people overall in the USA are seeking care from PCPs, the care delivered to those seeking care is becoming increasingly more complex over time when compared to Australia, which might, in part, contribute to fewer medical students choosing primary care as a specialty and increasing levels of burnout among the US PCP workforce.[29]

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Declarations:

Conflict of Interest: *The authors declare no competing interests.*

REFERENCES

1. **Colwill JM, Cultice JM, Kruse RL.** Will Generalist physician supply meet demands of an increasing and aging population? Health Aff (Millwood). 2008;27(Supplement 1: Web Exclusives):w232-w241. https://doi.org/10.1377/hlthaff.27.3.w232.
2. **Landon BE.** A step toward protecting payments for primary care. N Engl J Med. 2019;380(6):507-510. https://doi.org/10.1056/NEJMp1810848.
3. **Knight V.** American medical students less likely to choose to become primary care doctors | Kaiser Health News. *Kaiser Health News.* https://khn.org/news/american-medical-students-less-likely-to-choose-to-become-primary-care-doctors/. Published July 3, 2019. Accessed 23 Aug 2021.
4. **Ganguli I, Shi Z, Orav EJ, Rao A, Ray KN, Mehrotra A.** Declining use of primary care among commercially insured adults in the United States, 2008–2016. Ann Intern Med. 2020;172(4):240-247. https://doi.org/10.7326/M19-1834.
5. **Levine DM, Linder JA, Landon BE.** Characteristics of Americans with primary care and changes over time, 2002-2015. JAMA Intern Med. 2020;180(3):463-466. https://doi.org/10.1001/jamainternmed.2019.6282.
6. **Mehrotra A.** The convenience revolution for treatment of low-acuity conditions. JAMA. 2013;310(1):35-36. https://doi.org/10.1001/jama.2013.6825.
7. **Claxton G, Rae M, Young G, et al.** *2020 Employer Health Benefits Survey - Section 8: High-Deductible Health Plans with Savings Option.* Kaiser Family Foundation; 2020. https://www.kff.org/report-section/ehbs-2020-section-8-high-deductible-health-plans-with-savings-option/. Accessed 23 Aug 2021.
8. **Britt H, Miller G, Bayram C, et al.** *A Decade of Australian General Practice Activity 2006-07 to 2015-16.* University of Sydney; 2016. https://ses.library.usyd.edu.au/bitstream/handle/2123/15482/9781743325162_ONLINE.pdf?sequence=5. Accessed 24 Aug 2021.
9. **Harrison C, Bayram C, Miller GC, Britt HC.** The cost of freezing general practice. Med J Aust. 2015;202(6). https://www.mja.com.au/journal/2015/202/6/cost-freezing-general-practice. Accessed 14 June 2022.
10. **Henderson J, Britt H, Miller G.** Extent and utilisation of computerisation in Australian general practice. Med J Aust. 2006;185(2):84-87. https://doi.org/10.5694/j.1326-5377.2006.tb00478.x.
11. **Dingwall S, Henderson J, Britt H, Harrison C.** Adequacy of Australia's GP workforce: estimating supply and demand, 2005-06 to 2015-16. Aust Health Rev. 2020;44(2):328-333. https://doi.org/10.1071/ah18252.
12. Ambulatory Health Care Data. Centers for Disease Control and Prevention. Published July 16, 2021. https://www.cdc.gov/nchs/ahcd/index.htm. Accessed 24 Aug 2021.
13. **Britt H.** A new coding tool for computerised clinical systems in primary care–ICPC plus. Aust Fam Physician. 1997;26 Suppl 2:S79-82.
14. **Schenker N, Gentleman JF.** On judging the significance of differences by examining the overlap between confidence intervals. Am Stat. 2001;55(3):182-186.
15. CDC. Obesity is a common, serious, and costly disease. Centers for Disease Control and Prevention. Published June 7, 2021. https://www.cdc.gov/obesity/data/adult.html. Accessed 24 Aug 2021.

16. Overweight and obesity. Australian Institute of Health and Welfare. Published July 23, 2020. https://www.aihw.gov.au/reports/australias-health/overweight-and-obesity. Accessed 24 Aug 2021.
17. Diabetes. Australian Institute of Health and Welfare. Published July 2020. https://www.aihw.gov.au/reports/australias-health/diabetes. Accessed 24 Aug 2021.
18. *National Diabetes Statistics Report, 2020*. Centers for Disease Control and Prevention; 2020. https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf. Accessed 24 Aug 2021.
19. **Ostchega Y, Fryer CD, Nwankwo T, Nguyen DT.** *Hypertension prevalence among adults aged 18 and over: United States, 2017–2018*. Centers for Disease Control and Prevention; 2020:8. https://www.cdc.gov/nchs/data/databriefs/db364-h.pdf. Accessed 24 Aug 2021.
20. *High Blood Pressure*. Australian Institute of Health and Welfare; 2019. https://www.aihw.gov.au/reports/risk-factors/high-blood-pressure/contents/high-blood-pressure. Accessed 24 Aug 2021.
21. **Petterson S, McNellis R, Klink K, Meyers D, Bazemore A.** *The State of Primary Care in the United States: a Chartbook of Facts and Statistics*. Robert Graham Center; 2018.
22. **Barnett ML, Bitton A, Souza J, Landon BE.** Trends in outpatient care and implications for primary care, 2000-19. Ann Intern Med. In press.
23. **Ashwood JS, Gaynor M, Setodji CM, Reid RO, Weber E, Mehrotra A.** Retail clinic visits for low-acuity conditions increase utilization and spending. Health Aff Proj Hope. 2016;35(3):449-455. https://doi.org/10.1377/hlthaff.2015.0995.
24. Now more than 9,000 urgent care centers in the U.S., industry report says | FierceHealthcare. https://www.fiercehealthcare.com/practices/now-more-than-9-000-urgent-care-centers-u-s-industry-report-says. Accessed 13 Dec 2021.
25. **Chokshi DA.** Income, poverty, and health inequality. JAMA. 2018;319(13):1312-1313. https://doi.org/10.1001/jama.2018.2521.
26. **West J, Mehrotra A.** The future ecology of care. Ann Intern Med. 2016;164(8):560-561. https://doi.org/10.7326/M15-1978.
27. **Sumit DA, Sanjay B, Bruce EL.** The underuse of medicare's prevention and coordination codes in primary care a cross-sectional and modeling study. Ann Intern Med. 2022. https://doi.org/10.7326/M21-4770.
28. **Basu S, Phillips RS, Song Z, Bitton A, Landon BE.** High levels of capitation payments needed to shift primary care toward proactive team and nonvisit care. Health Aff (Millwood). 2017;36(9):1599-1605. https://doi.org/10.1377/hlthaff.2017.0367.
29. **Shanafelt TD, Hasan O, Dyrbye LN, et al.** Changes in Burnout and Satisfaction With Work-Life Balance in Physicians and the General US Working Population Between 2011 and 2014. Mayo Clin Proc. 2015;90(12):1600-1613. https://doi.org/10.1016/j.mayocp.2015.08.023.