The Effect of COVID-19 on Care for Chronic Wounds among Medicare Beneficiaries using Medicare Claims – 2019, 2020, and 2021

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Background

Innovative containment and mitigation measures that became essential during the COVID-19 pandemic led to changes in the way all healthcare was delivered in the United States. Clinicians and policymakers alike have expressed concerns that the actions taken in response to the COVID-19 could be impeding their established wound care therapies and practices. Wound care among elderly Americans especially suffered during the pandemic when routine medical visits, including many to wound clinics, were reduced because this care was considered "nonessential." Wound centers were closing or reducing their hours due to provider shortages as the healthcare system struggled to care for patients infected with COVID-19.

Due to their multiple underlying comorbidities, many wound care patients are disproportionately represented within the group of patients who are at high risk for the worst outcomes if exposed to COVID-19.[1] Some healthcare providers predicted increases in amputations as a consequence of both service disruptions and patients delaying care because they did not want to leave home for fear of becoming infected. Some investigators termed the increase in diabetes-related amputations as a "pandemic within a pandemic."[2]

The emergence of the Centers for Medicare and Medicaid Services (CMS) "Hospitals without Walls" initiative and the easing of federal rules and the institution of new regulatory flexibilities enabled a paradigm shift in wound care provision. Care was increasingly delivered via telemedicine and in the patients' homes, and away from the outpatient hospitals. The Commonwealth Fund reported that early in the COVID-19 pandemic, the number of visits to ambulatory care practices declined by nearly 60 percent.[3]

Objectives

The purpose of this study is to examine the effect of COVID-19 on the provision of chronic wound care for Medicare beneficiaries in the years 2019, 2020, and 2021 using 100% Medicare claims to perform three annual cross-sectional analyses. The study includes analyses of wounds in aggregate, by wound type, and by setting.

Methods

These retrospective cross-sectional analyses of Medicare claims data included beneficiaries who received care for over a dozen types of wounds: diabetic foot ulcers and infections, arterial ulcers, skin disorders and infections, surgical wounds and infections, traumatic wounds, venous ulcers and infections, unspecified chronic ulcers, and others. We extracted all claims for each targeted beneficiary across all care settings and from the Medicare Beneficiary Summary File (MBSF) for the years 2019, 2020, and 2021. In particular:

- We examined the overall prevalence rates and stratified the rates by each wound type. Prevalence rates were computed as the number of beneficiaries receiving wound care during the year divided by the total number of beneficiaries in the sample.
- Medicare Advantage (MA) claims for 2019 were examined, but due to there being a lag in the availability of claims relative to fee-for-service (FFS), we imputed 2020 and 2021, assuming the same year-to-year growth patterns as FFS claims. MA expenditures were calculated as the ratios of MA beneficiaries to FFS beneficiaries for each wound type multiplied by the estimated FFS expenditures for each wound type assuming that utilization patterns and fee schedules between two groups are similar.
- We used three methodologies to account for that portion of payment that was attributable to each of the patient's conditions.
  1. The first method (low range estimate) counted only Medicare provider payments when a wound was the primary diagnosis on the claim, excluding beneficiary deductible and coinsurance.
  2. The second method (mid range estimate) was more inclusive and attributed the entire payment of a claim to wound care if a wound diagnosis was the primary diagnosis. However, the following methodology for attribution was used when a wound was a secondary diagnosis:
     a. Hospital inpatient, skilled nursing facility (SNF), home health agency (HHA), and hospice: each secondary diagnosis had an equal weight and was attributed half of the total cost of the stay.
     b. Hospital outpatient: all revenue center–specific wound care service payments were 100% attributed to wound care. The remaining amount (total payment – direct wound care payments) were attributed assuming each secondary diagnosis had an equal weight and were attributed half of the remaining amount. These were based on specific Healthcare Common Procedure Coding System (HCPCS) codes associated with wound care. We assumed the cost of these services were 100% related to the cost of a wound only if a wound diagnosis was also found on the claim.
     c. Part B provider (which includes physician charges) and DME (durable medical equipment): Medicare provider payments were counted if the claim level diagnosis code was associated with wound care.
  3. The third method (high range estimate) counts Medicare provider payments when a wound is either the primary or secondary diagnosis, which provides an upper bound estimate to total expenditures associated with wound care (as it assumes the wound is always the underlying cause of the service).

Results

Table 1. Number of Medicare Beneficiaries by Type of Wound 2019-2021
Using all claim diagnoses for IP,OP,SNF,HHA,HSP,Carrier,DME
Actual MA data for 2019, Extrapolated to MA for 2020 and 2021

Wound Type	2019	2020	2021
Total Number of Medicare Beneficiaries (FFS + MA)	64,430,720	65,901,898	66,962,052
Venous	627,281	566,188	616,529
Pressure Ulcer	1,276,550	1,292,965	1,322,939
Chronic Ulcer	1,489,821	1,401,758	1,468,214
Surgical Wounds	2,388,148	2,194,698	2,339,108
Skin Disorders	3,421,210	3,149,729	3,855,412
Traumatic Wounds	1,007,659	911,908	990,755
Burns	144,759	127,315	132,645
Arterial Ulcer	508,556	459,260	473,602
Diabetic Foot Ulcer	507,816	488,831	491,628
Surgical Infections	2,419,575	2,119,476	2,190,360
Diabetes Infections	2,414,357	2,175,066	2,229,702
Venous Infections	899,907	799,499	883,123
Skin Diseases	178,707	156,995	172,747
Other Wound	45,908	230,925	288,410
Radiation Late Effects	147,531	136,145	145,851
All Wounds	**10,555,301**	**9,801,621**	**10,756,347**

Table 2. Medicare Spending on Wound Care by Type of Service and Cost Attribution Method for 2019-2021 (in millions)

Type of Service	2019			2020			2021		
	Principle Diagnosis	Principle and Attributed Secondary	Principle or Any Secondary	Principle Diagnosis	Principle and Attributed Secondary	Principle or Any Secondary	Principle Diagnosis	Principle and Attributed Secondary	Principle or Any Secondary
Hospital Inpatient	$4,157.5	$4,890.9	$23,749.0	$3,535.0	$4,248.2	$22,950.7	$3,485.8	$4,186.1	$22,878.2
SNF	$877.8	$1,049.6	$4,189.4	$688.5	$871.9	$4,545.7	$657.2	$829.6	$4,297.6
HHA	$1,143.5	$1,288.0	$2,902.8	$1,523.7	$1,660.4	$3,801.7	$1,483.7	$1,605.5	$3,662.9
Hospice	$5.4	$52.0	$741.0	$5.8	$53.9	$773.4	$6.0	$53.1	$778.8
Hospital Outpatient	$2,514.4	$2,760.1	$4,336.3	$2,195.8	$2,410.8	$3,883.8	$2,289.1	$2,502.6	$3,951.6
Part B Carrier	$4,134.0	$4,134.0	$4,134.0	$3,948.3	$3,948.3	$3,948.3	$4,465.1	$4,465.1	$4,465.1
DME	$734.4	$734.4	$734.4	$674.4	$674.4	$674.4	$684.8	$684.8	$684.8
Total Medicare FFS	**$13,567.0**	**$14,909.0**	**$40,786.9**	**$12,571.4**	**$13,867.8**	**$40,578.1**	**$13,071.7**	**$14,326.8**	**$40,719.0**
Estimated MA Spending	$8,926.3	$9,788.6	$26,290.4	$9,175.7	$10,098.3	$28,972.9	$10,917.6	$11,938.5	$33,247.2
Total FFS + MA	**$22,493.3**	**$24,697.6**	**$67,077.3**	**$21,747.2**	**$23,966.2**	**$69,550.9**	**$23,989.4**	**$26,265.3**	**$73,966.2**

Table 3. Medicare Spending on Wound Care by Type of Wound and Cost Attribution Method for 2019-2021 (in millions)

Wound Type	2019			2020			2021		
	Principle Diagnosis	Principle and Attributed Secondary	Principle or Any Secondary	Principle Diagnosis	Principle and Attributed Secondary	Principle or Any Secondary	Principle Diagnosis	Principle and Attributed Secondary	Principle or Any Secondary
Venous	$1,131.1	$1,139.4	$1,406.8	$1,176.4	$1,184.4	$1,505.3	$1,370.5	$1,380.3	$1,747.9
Pressure Ulcer	$3,161.4	$3,651.3	$15,996.4	$3,530.2	$4,046.3	$17,340.9	$3,929.7	$4,463.3	$18,506.1
Chronic Ulcer	$1,734.7	$2,027.2	$5,139.8	$1,824.2	$2,099.0	$5,454.7	$2,277.0	$2,561.7	$6,029.5
Surgical Wounds	$5,980.4	$6,449.5	$17,451.2	$5,556.7	$5,992.5	$16,956.1	$5,905.6	$6,333.4	$17,386.6
Skin Disorders	$626.3	$731.0	$2,283.1	$557.1	$662.2	$2,358.2	$664.5	$773.2	$2,600.5
Traumatic Wounds	$584.8	$611.3	$1,053.1	$553.5	$578.9	$1,022.4	$731.4	$755.3	$1,214.0
Burn	$342.7	$342.8	$448.2	$366.7	$365.6	$468.8	$394.5	$392.7	$498.4
Arterial Ulcer	$672.4	$719.9	$1,339.5	$679.7	$728.5	$1,441.4	$706.7	$761.3	$1,579.4
Diabetic Foot Ulcer	$358.7	$639.0	$3,968.9	$394.8	$664.5	$4,152.2	$477.6	$745.6	$4,246.0
Surgical Infection	$3,444.4	$3,600.4	$7,020.9	$3,034.5	$3,181.4	$6,646.1	$3,190.1	$3,337.7	$6,943.2
Diabetes Infection	$3,857.9	$4,118.3	$9,340.3	$3,442.7	$3,692.3	$9,014.7	$3,606.7	$3,852.7	$9,236.1
Venous Infection	$185.1	$222.6	$597.4	$187.6	$224.4	$637.5	$233.2	$277.4	$783.0
Skin Diseases	$34.4	$41.3	$100.5	$34.1	$40.9	$103.2	$46.2	$52.4	$111.2
Other Wounds	$14.3	$28.2	$314.5	$90.7	$177.8	$1,886.0	$117.0	$229.3	$2,470.1
Radiation Late Effects	$364.7	$375.4	$616.8	$318.3	$327.4	$563.3	$338.8	$349.0	$614.2
Total All Wounds	**$22,493.3**	**$24,697.6**	**$67,077.3**	**$21,747.2**	**$23,966.2**	**$69,550.9**	**$23,989.4**	**$26,265.3**	**$73,966.2**

Key Findings

- We estimated that 16.4 percent of Medicare beneficiaries (10.6 million) had at least one type of wound in 2019. In the next two years, 14.8 percent and 16.1 percent of Medicare beneficiaries (9.8 million and 10.8 million) were diagnosed with at least one type of wound, which was slightly less than the prevalence estimated in 2019.
- Skin disorders were the leading types of wounds in the Medicare population in all three years, as there were over 3 million diagnosed beneficiaries each year (approximately 32.4 percent of the approximately 10.6 million beneficiaries diagnosed with a wound in 2019 increasing to 35.8 percent of the approximately 10.8 million beneficiaries diagnosed with a wound in 2021). Approximately six percent of Medicare beneficiaries had a diagnosis of skin disorder in 2021.
- Surgical and diabetes infections followed, with over 2 million diagnosed beneficiaries in each of 2019, 2020, and 2021 (approximately 22.9 percent of all beneficiaries diagnosed with a wound in 2019 decreasing to 20.4 and 20.7 percent respectively in 2021). Approximately 3.3 percent of the beneficiary population had a diagnosis of surgical or diabetes infection in 2021.
- Surgical wounds were also very prevalent in all three years, numbering 2.4 million in 2019, 2.2 million in 2020, and 2.3 million in 2021 (approximately 22 percent of beneficiaries diagnosed with a wound in 2021). Approximately 3.5 percent of Medicare beneficiaries had a diagnosis of surgical wounds in 2021.
- Traumatic wounds decreased from one million in 2019 to 900,000 in 2020, and to just under one million in 2021 (decreasing from 9.5 percent in 2019 to 9.2 percent in 2021). Prevalence in the Medicare beneficiary population was 1.3 percent in 2021.
- In Table 2, over the 3-year period, using our mid-range estimates of Medicare expenditures, wound care totaled $24.7B in 2019, $23.9B in 2020, and $26.3B in 2021.
- We found that the highest spending was in the hospital inpatient setting, although it declined between 2019 and 2021. The next highest spending was for Part B carrier services which increased between 2019 and 2021. This analysis highlights how wound care has shifted away from hospitals toward physician offices.
- We also found that 7 percent of spending for wound care was for SNFs, declining to 5.8 percent in 2021. On the other hand, expenditures for home health were nearly 9 percent in 2019, increased to 12 percent in 2020, then were 11 percent in 2021. We believe that the COVID PHE was responsible for this shift. DME and hospice expenditures were unchanged over the three years at approximately 5 percent and 0.4 percent respectively.
- As shown in Table 3, the highest cost driver was surgical wound over the 3-year period. In 2019, diabetes infection was the next highest cost driver, followed by pressure ulcer and surgical infection. In 2020 and 2021, pressure ulcer was the second highest cost driver, followed by diabetes infection and surgical infection.

Discussion

- These results emphasize the ongoing prevalence of chronic wounds among Medicare beneficiaries and suggest the decrease in care during the pandemic contributed to a relative rebound (if not an increase) in care and expenditures in 2021.
- We found a shift in the site of care from skilled nursing facilities toward home health. Further research is needed to determine whether these shifts were due to individuals seeking to avoid COVID-19 exposure.

References

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