DIABETES CANADA

THE ECONOMIC IMPACT OF OFFLOADING DEVICES FOR THE PREVENTION OF AMPUTATIONS IN

BRITISH COLUMBIA

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About this Study

This report was commissioned by Diabetes Canada in 2016 to assess the potential impact of public funding for offloading devices (*specialized products that relieve pressure on foot ulcers to help with healing, prevent recurring wounds and reduce the risk of amputation*) on the cost of care for diabetic foot ulcers in British Columbia. Diabetic foot ulcers are common and are considered by people with diabetes to be the most feared consequences of diabetes. Indeed, foot complications, including infections, ulcerations and amputations, are a major cause of morbidity and mortality in people with diabetes. Furthermore, foot complications impose significant costs on the health-care system in British Columbia. These costs can, in part, be mitigated through the increased use of offloading devices to treat foot ulcers.

Diabetes Canada is a leading national and international authority on diabetes with a mission to lead the fight against diabetes by helping those affected by diabetes to live healthy lives, preventing the onset and consequences of diabetes and discovering a cure. Diabetes Canada has a rich heritage of excellence and leadership, which began with its co-founders and the co-discoverers of insulin, Sir Frederick Banting and Dr. Charles Best. Diabetes Canada delivers programs and services for people affected by diabetes, funds leading-edge research and produces globally recognized *Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada*. Diabetes Canada works in communities across the country to promote the health of people with diabetes and to reduce the complications of diabetes through its national network of volunteers, employees, health-care professionals, researchers, partners and supporters. For more information, visit www.diabetes.ca.

This report was prepared by Robin Somerville, Director, Centre for Spatial Economics (C_4SE) and Seema Nagpal, Director of Public Policy, Diabetes Canada. The C_4SE monitors, analyzes and forecasts economic and demographic change throughout Canada at virtually all levels of geography. They also prepare customized studies on the economic, industrial and community impacts of various fiscal and other policy changes, and develop customized impact and projection models for in-house client use. The C_4SE provides economic models, analysis and forecasts to nine provincial and territorial governments across Canada. For more information, visit www.c4se.com.

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Executive Summary

In British Columbia, diabetic foot ulcers (DFU) currently impose direct health care costs of between $98-120 million annually and indirect costs of between $11-18 million annually. Provincial funding of offloading devices—or devices that relieve pressure on ulcers—could yield net direct cost savings of between $14-23 million—a reduction of between 12 and 23 per cent over one year. In addition to the economic burden on public funders of heath care, diabetes has a significant impact on disability and quality of life.[1234] The analysis in this report is based on a model constructed to estimate the prevalence and cost of DFU in British Columbia in 2016 and the impact that the use of offloading devices in their treatment could have on those costs and health outcomes.

Foot complications, including infections, ulcerations and amputations, are a major cause of morbidity and mortality in people with diabetes. In Canada, diabetes is the leading cause of non-traumatic lower limb amputations. Diabetes-related foot wounds contributed to about one-third of all amputations performed in hospitals across Canada in 2011-12. The mortality rate for people experiencing diabetic foot complications is worse than rates of some forms of cancer; in fact, the five-year mortality rate for those with a neuropathic ulcer is higher than that of Hodgkin's disease, breast cancer or prostate cancer; and those with an ischemic ulcer have a five-year mortality higher than those with colon cancer. Effective treatment of foot ulcers may be associated with significant cost savings to the health-care system.

The risk of an amputation increases dramatically once an ulcer appears, but effective treatment of the ulcer with an offloading device can reduce this risk. Offloading devices used in the treatment of DFU vary in cost and effectiveness. Total contact casts (TCC), custom braces and ankle and foot orthoses significantly improve patient outcomes, but are not widely used due to issues of affordability. Provincial funding of offloading devices for the treatment of DFU in British Columbia is expected to significantly increase their use by patients in the province and to improve their health outcomes.

Of the 460,000 people with diabetes in British Columbia, between 5,000 and 8,300 were expected to have a DFU in 2016. Of these, about 590 were expected to need to have a lower limb amputated as a result of their condition and those amputations were associated with about 230 premature deaths. The use of offloading devices can significantly reduce the number of amputations, allow wounds to heal faster and lower the risk of complications. All these factors combine to significantly reduce the overall cost of DFU in British Columbia and their toll on British Columbians living with diabetes.

Introduction

Diabetes is a condition characterized by an elevation in blood glucose (blood sugar) levels either because the body cannot produce insulin—a hormone that controls the amount of sugar in the blood—or cannot properly use the insulin it produces. High levels of blood sugar can damage organs, blood vessels and nerves. Diabetes is a leading cause of blindness, end-stage renal disease, heart disease, stroke and non-traumatic lower-limb amputations in Canadian adults. Persons who are diagnosed can be classified as having type 1, type 2 or gestational diabetes, or prediabetes.

The authors of this report acknowledge the human toll that complications of diabetes, particularly lower extremity complications can impose upon persons with diabetes. The fear of complications and the emotional strain of a non-healing ulcer and/or amputation can place an enormous burden on individuals and their families. However, this report will exclusively focus on the cost implications of treating diabetic foot ulcers (DFU) by increasing the use of offloading devices—or devices that relieve pressure on ulcers and allow them to heal—to treat foot ulcers in British Columbia. Foot complications, including infections, ulcerations and amputations, are a major cause of morbidity and mortality in people with diabetes. In Canada, diabetes is the leading cause of non-traumatic lower limb amputations. Diabetes-related foot wounds contributed to about one-third of all amputations performed in hospitals across Canada in 2011-12. The mortality rate for people experiencing diabetic foot complications is worse than rates of some forms of cancer; in fact, the five-year mortality rate for those with a neuropathic ulcer is higher than that of Hodgkin's disease, breast cancer or prostate cancer; and those with an ischemic ulcer have a five-year mortality higher than those with colon cancer.

Effective treatment of foot ulcers may be associated with significant cost savings to the health-care system. Offloading devices used in the treatment of DFU vary in cost and effectiveness with the least expensive being the least effective. Total contact casts (TCC) and custom braces, ankle and foot orthoses significantly improve patient outcomes, but cost about $2,000 and so are not widely used due to issues of affordability. Provincial funding of offloading devices for the treatment of DFU in British Columbia would significantly increase their use by patients in the province and improve their health outcomes. This report examines the costs of provincial funding, describing both the cost of offloading devices as well as the cost savings from avoided health services. The overall health-care costs and health benefits arising from access to publicly funded offloading devices are estimated. The costs are calculated from both a payer and a societal perspective.

The analysis for this report was conducted using a model of the prevalence and cost of DFU in British Columbia in 2016 constructed by the C_4SE. This model examined the cost implication of increasing the proportion of patients using an offloading device to treat their DFU based on a set of assumptions regarding the prevalence of DFU in the province.

Diabetes in British Columbia

The number of people with diabetes in British Columbia was estimated to be over 460,000 in 2016, with the distribution by age and sex shown in Figure 1. More males had diabetes than females (53 per cent of the total) and the largest group of persons with diabetes was between the ages of 65 and 69. The estimated prevalence of diabetes is derived from Diabetes Canada's Diabetes Cost Model (DCM) for British Columbia.[5]

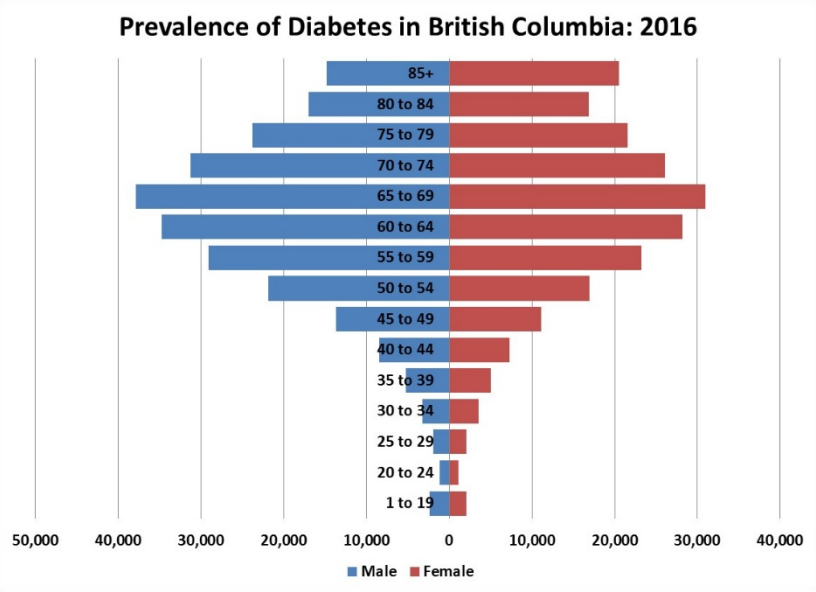

Figure 1

Model Assumptions

A model was constructed to estimate the number of persons with DFU in British Columbia in 2016 and their health outcomes based whether or not they used an offloading device. A set of estimates for the cost of treating DFU was then constructed based on the health outcomes under each set of assumptions for the use of offloading devices. This section of the report describes the assumptions and data used to construct the model.

DFU Cost Model

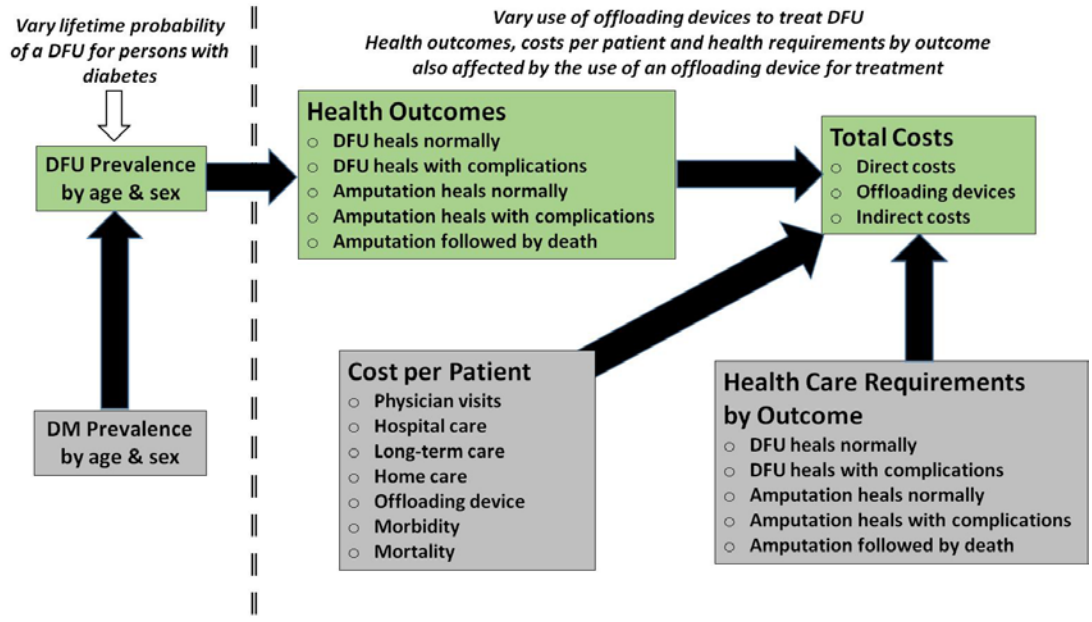

Figure 2

Figure 2 provides an overview of the DFU cost model structure. The prevalence of DFU by age and sex is determined by the prevalence of diabetes in British Columbia in 2016 and by the assumed lifetime probability of a DFU for persons with diabetes. Health outcomes for the population of patients with a DFU are determined by the number of persons with a DFU and the likelihood of each outcome. Treatment costs and societal costs per patient are multiplied by the health-care requirements for each health outcome and then the number of patients for each health outcome to determine total costs. The total cost of DFU varies with the proportion of patients assumed to use an offloading device in their treatment because of differences in health outcomes, per patient costs, and health-care requirements by outcome that arise when these devices are used.

DFU Prevalence and Outcome Estimates

The prevalence of DFU in British Columbia was estimated based on three possible scenarios where the lifetime probability of a person with diabetes developing a DFU varies from 15 to 25 per cent. The distribution of DFU by age and sex is based on the national distribution estimated by Hopkins et al.[6] combined with the British Columbia diabetes prevalence estimates for 2016 and varies between 5,000 and 8,300. These figures are shown in the Simulation 1, Simulation 2, and Simulation 3 rows in Table 1.

There were an estimated 586 amputations related to DFU in British Columbia in 2016. This estimate was derived from data for Ontario which reported 1,970[*] lower limb amputations performed in that province in 2012 on persons with diabetes. The 2012 amputations were adjusted by the 2016 diabetes rate and then adjusted to the proportion of all amputations in people with diabetes that are the result of a non-healing DFU (85 per cent).[7] These 586 amputations related to non-healing DFU were held constant and resulted in an amputation rate of between 7.1 and 11.8 per cent for the three model simulations.

A recent study by Hopkins et al. estimates the national burden of illness in Canada for DFU for 2011. They found the national prevalence of DFU to be 25,600 in 2011, but acknowledge that this likely underestimates the true prevalence given that the estimate is based on data that exclude DFU treated outside of acute care facilities. Applying their age and sex DFU prevalence rates and their estimated amputation rate (23.6 per cent) to British Columbia's diabetes population yields a prevalent population of 4,228 DFU cases in the province and 997 amputations in 2016. Alternatively, Fife estimates the amputation rate for non-healing DFUs is between 2 and 10 per cent. Holding the number of amputations in British Columbia constant (n= 586 amputations), the estimate for the number of DFU in British Columbia is between 4,964 and 29,286. There is a large variation in these estimates, emphasizing the need for more population-based research to develop more accurate estimates of the prevalence of DFU, their complications and the likelihood of an amputation. For the present analysis, a range of estimates is used to describe the impact of public funding of offloading devices.

[*] Hospital separation data in Ontario were obtained to determine the number of amputations performed on people with diabetes in 2012.

Table 1

DFU Prevalence in British Columbia				
	Pr(DFU)	# DFU	Amp Rate	# Amp
Hopkins et al.	15%	4,228	23.6%	997
Sim1	15%	4,964	11.8%	586
Sim2	20%	6,618	8.9%	586
Sim3	25%	8,273	7.1%	586
Fife - low		5,857	10.0%	586
Fife - med		11,714	5.0%	586
Fife - high		29,286	2.0%	586

Once a patient has a DFU, it can heal without complications, heal with complications or require a lower limb amputation. If the patient requires an amputation, it can heal normally, heal with complications or result in the patient's death. The following section provides a discussion of the probability associated with each of these events and the impact that offloading devices can have on each outcome.

Probability DFU heals: the probability that a DFU heals without complications without the aid of an offloading device is assumed to be 31 per cent.[8] This probability rises to 64 per cent when an offloading device is used based on the effectiveness of each device and the proportion in which they are assumed to be used.[9]

Probability DFU heals with complications: the probability of the wound healing with complications for both cases when an offloading device is used or not is treated as the residual from healing without complications and amputation.

Probability of amputation: Fife estimates the probability of an amputation when an offloading device is used is expected to be between 1.5 and 5 per cent. The upper figure of 5 per cent was used in order to ensure that the results could be considered conservative. The probability of an amputation when no offloading device is used varies depending on the assumed lifetime probability of a person with diabetes developing a DFU: at 25 per cent, it is 7.1 per cent; at 20 per cent, it is 8.9 per cent;, and at 15 per cent, it is 11.8 per cent (see Table 1). The varying rates of amputation ensure that the number of amputations associated with a DFU in British Columbia in 2016 when no offloading devices is held constant at 590.

Probability amputation heals: this is residual and, based on assumptions about the proportion of complications and deaths following amputation. This is 50 per cent when no offloading device is used, but is lower when an offloading device is used to adjust the number of premature deaths attributed to DFU.

Probability amputation heals with complications: this is assumed to be 10 per cent. The range of outcomes provided by experts was between 5 and 10 per cent.

Probability of death following amputation: this is assumed to be 40 per cent when no offloading device is used. While the use of an offloading device will reduce the likelihood of amputation, it does not, however, reduce the likelihood of premature mortality attributed to DFU. This is because the severity of the patient's condition makes it more likely that they will die of another complication associated with diabetes. Studies estimate the rate of mortality after one year to be between 20 and 40 per cent and rising to between 60 and 80 per cent at five years. [10] [11]

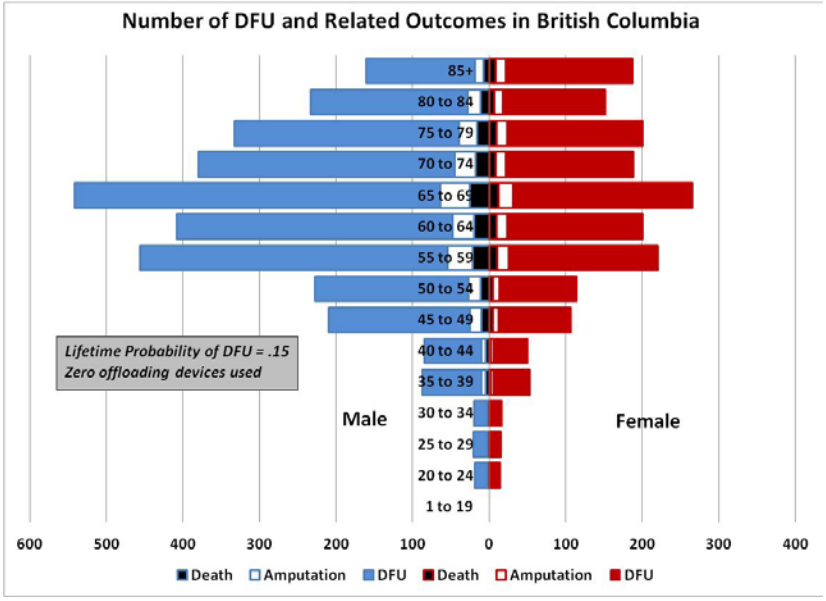

Figure 3

Figure 3 shows the distribution of DFU in 2016 by age and sex based on the assumption of a 15 per cent lifetime probability of a DFU and zero per cent of patients using an offloading device. Figure 3 also shows the number of amputations and deaths associated with DFU by age and sex. Males account for nearly two thirds of all DFU and although DFU can occur in patients in their 20s, over 60 per cent arise between the ages of 55 and 85.

Unit Cost Estimates

The unit cost estimates or assumptions are the costs per patient associated with each health outcome from a DFU. Many of the unit cost values were derived from the Economic Burden of Illness in Canada (EBIC)[12] while others were derived from the analysis performed by Hopkins et al.

Physician visits: the cost per visit to a physician (GP or specialist) is estimated from EBIC. The British Columbia cost by age and sex was divided by the net number of physician visits by persons with diabetes in the same year from the DCM. The average cost between 2006 and 2008 by age and sex, measured in 2010 dollars, was used and then converted to 2016 dollars.

Hospital days: the average cost per hospital day associated with DFU in Canada was estimated to be $980 in 2011 by Hopkins et al. This value was converted to 2016 dollars.

Long-term care: the average cost per person for long-term care for both new and current residents was obtained from Hopkins et al and, when converted to 2016 dollars, is $19,000. The use of an offloading device does not directly affect the likelihood requiring long-term care or its cost; so this cost category is unaffected by the use of offloading devices.

Home care: the average cost per person for home care was obtained from Hopkins et al. and, when converted to 2016 dollars, is $10,700. It should be noted that the home care costs used in this analysis exclude informal caregiver costs. In Hopkins et al., caregiver costs for home care are based on a value of time spent by relatives or other unpaid persons providing care for the patient. These costs are not used in this analysis, because this category of costs is not currently included in the EBIC methodology for indirect costs.

The use of offloading devices reduces the requirement for home care and, therefore, the average per patient cost of home care. TCC and cast shoes eliminate the need for home care; a pneumatic air cast reduces the duration of home care by 50 per cent while a post-operative shoe reduces it by 10 per cent. The weighted average reduction in per patient costs when using an offloading device and when the DFU heals is 76 per cent. There is no change in the need for home care if the patient requires an amputation, with or without the prior use of an offloading device.

Disability: the morbidity costs are estimated from EBIC. The national cost by age and sex was divided by the number of persons with diabetes in the same year from the DCM adjusted by the loss of productivity for that age and sex group derived from the Loss of Productivity module in the Canadian Community Health Survey (CCHS) public use microdata file for the 2011-12 cycle.[13] Morbidity costs in EBIC represent the potential lost production in the economy from illness and are assumed to exist for as long as it takes the worker to return to work or for them to be replaced. The costs associated with those not in the labour force–for reasons of age or other personal circumstances–are assumed to be zero. The average cost between 2006 and 2010 by age and sex, measured in 2010 dollars, was used and then converted to 2016 dollars.

Mortality: the cost of premature mortality is estimated from EBIC. The British Columbia cost by age and sex was divided by the number of persons with diabetes that died in the same year from the DCM. Mortality costs in EBIC represent the potential lost production in the economy from premature mortality and are assumed to exist for as long as it takes to replace a deceased worker. The costs associated with those not in the labour force–for reasons of age or other personal circumstances–are assumed to be zero. The average cost between 2006 and 2008 by age and sex, measured in 2010 dollars, was used and then converted to 2016 dollars.

Offloading device: While orthopedic foot wear and custom-molded orthotics are considered an option by some clinicians, we assumed those offloading devices were modalities reserved for patients whose ulcers heal as a means to prevent recurrence. Offloading devices were assumed to be used in the following proportions with average costs (measured in 2012 US dollars) based on Alavi et al.[14]:

o	Total contact cast	40%	$1,800
o	Air walking cast	30%	$300
o	Custom braces, ankle and foot orthoses	20%	$2,500
o	Post-operative shoe	10%	$75

Using this information, the weighted average cost for an offloading device, expressed in 2016 Canadian dollars, is $1,400. The cost of orthotist visits is added to this based on: eight visits for a TCC, one for an air walking cast, three for custom braces, ankle and foot orthoses, and none for a post-operative shoe for an average of 4.1 visits for all offloading devices.

Total Cost Estimates

The unit cost estimates are multiplied by the number of persons with a DFU based on their health outcome and their use of an offloading device to generate an estimate of the total cost of the illness.

Physician visits: the cost of physician visits is determined by the number of DFU patients by outcome times the average cost per visit times the number of visits associated with each outcome. The number of physician visits within one year for a patient with a DFU that heals normally is assumed to be 12 with no offloading device and this falls to six physician visits when an offloading device is used. Twenty physician visits are required for a DFU that heals with complications when no offloading device is used and this falls to 12 physician visits when an offloading device is used. Four physician visits are required for an amputation that

heals normally and eight physician visits are required for an amputation that heals with complications.

Hospital days: the cost of hospital care is determined by the number of DFU patients by outcome times the average cost per visit times the number of days associated with each outcome. The average number of days spent as an inpatient in hospital when the DFU heals normally is 3.1 plus an average of another 1.8 days for ER and clinic visits. The number of days spent in hospital rises to 6.7 when there are complications plus 1.8 days for ER and clinic visits. The number of days spent in hospital when the patient must have a lower limb amputated is 71.9 plus 1.8 days for ER and clinic visits and a further 12 days for rehab clinic visits. Hopkins et al. estimate that the average cost of ER, clinic and rehab clinic visits is 20 per cent of the inpatient hospital day.

Long-term care: Hopkins et al. estimate that 14 per cent of DFU patients require long-term care. This proportion is multiplied by the average cost per patient and the number of patients to determine the total cost. The use of an offloading device does not affect these costs.

Home care: Hopkins et al. estimate that 22 per cent of DFU patients require home care. This proportion is multiplied by the average cost per patient and the number of patients to determine the total cost. As discussed above, the use of offloading devices reduces the requirement for home care by 76 per cent for patients with a DFU that heals, but there is no reduction in the need for home care if the patient requires an amputation.

Disability: the disability cost is determined multiplying all persons with a DFU that either avoid an amputation or survive it times their per person morbidity cost by age and sex from EBIC. Average morbidity costs for persons with DFU that heal normally are assumed to be one half of those for all other persons.

Mortality: the mortality cost is determined by the number of patients that die within a year of an amputation or from complications due to diabetes by age and sex times their per person mortality cost from EBIC.

Offloading device: the cost of offloading devices is determined by the number of DFU patients that use a device times the average cost of a device.

Results

This section of the report presents the impact on costs of DFU in British Columbia in 2016 from an increase in the use of offloading devices to treat foot ulcers. Direct costs include hospital costs, physician visits, long-term care and home care. Indirect costs include morbidity and premature mortality costs. Total costs from a payer perspective are the sum of direct costs and the cost of offloading devices; adding indirect costs yields the cost from a societal perspective.

Table 2 provides information on the overall prevalence of DFU and the number of amputations and premature deaths that can be attributed to them for three scenarios in which the lifetime probability of a person with diabetes suffering from a DFU varies from 15 to 25 per cent. The number of amputations, premature deaths, and the costs of treatment vary based on the proportion of persons using an offloading device to treat their DFU. This proportion is varied from zero to 75 per cent for each of the three scenarios.

As discussed in the previous section, the estimated number of DFU varies between 5,000 and 8,300 for each of the three scenarios. When the proportion of persons using an offloading device is zero, the number of amputations is 590 leading to 230 premature deaths. If 75 per cent of patients with a DFU use an offloading device in their treatment then the number of amputations falls to between 330 and 460 depending on the scenario. Unfortunately, while the number of amputations falls the number of premature deaths from DFU remains constant regardless of whether an amputation is avoided due to the use of an offloading device. This is due to the severity of damage to the circulatory system that precipitated the DFU. Action to reduce the incidence of DFU will be required to reduce premature mortality.

Table 2

The Cost of Diabetic Foot Ulcers in British Columbia (2016)

Proportion with access to offloading devices:	Lifetime Probability of DFU = .15				Lifetime Probability of DFU = .20				Lifetime Probability of DFU = .25			
	0%	25%	50%	75%	0%	25%	50%	75%	0%	25%	50%	75%
Number of Persons												
DM Prevalence	463,369	463,369	463,369	463,369	463,369	463,369	463,369	463,369	463,369	463,369	463,369	463,369
DFU	4,964	4,964	4,964	4,964	6,618	6,618	6,618	6,618	8,273	8,273	8,273	8,273
Amputations	586	501	417	333	586	522	458	395	586	543	500	457
Premature Deaths	234	234	234	234	234	234	234	234	234	234	234	234
Millions of 2016 Dollars												
Total Cost	$108.3	$100.2	$92.1	$84.0	$123.0	$116.1	$109.2	$102.3	$137.8	$132.1	$126.4	$120.6
Direct	$97.5	$87.9	$78.3	$68.7	$108.5	$99.6	$90.7	$81.8	$119.5	$111.3	$103.1	$94.8
Indirect	$10.8	$10.2	$9.7	$9.1	$14.5	$13.8	$13.0	$12.3	$18.2	$17.3	$16.4	$15.5
Offloading Devices Cost	$0.0	$2.1	$4.1	$6.2	$0.0	$2.7	$5.5	$8.2	$0.0	$3.4	$6.9	$10.3
Average Cost per DFU ($)												
Total Cost	$21,818	$20,187	$18,556	$16,926	$18,591	$17,548	$16,504	$15,461	$16,655	$15,964	$15,273	$14,582
Direct	$19,648	$17,713	$15,777	$13,841	$16,399	$15,050	$13,702	$12,354	$14,449	$13,453	$12,457	$11,461
Indirect	$2,170	$2,059	$1,949	$1,839	$2,192	$2,082	$1,972	$1,861	$2,206	$2,096	$1,985	$1,875
Offloading Devices Cost	$0	$415	$831	$1,246	$0	$415	$831	$1,246	$0	$415	$831	$1,246

The overall cost of DFU—direct plus indirect and the cost of offloading devices–is estimated to be between $108-138 million when no offloading devices are used. When 75 per cent of patients use an offloading device to treat their DFU, the overall cost falls to between $84-121 million a year.

Table 2 also shows that the average cost in 2016 is estimated to lie between $16,660 and $21,820 per DFU when no offloading devices are used. When 75 per cent of patients used an offloading device to treat their DFU, the average cost falls to between $14,580 and $16,930.

Table 3 presents the results in terms of the impact of increasing the proportion of persons using an offloading device to treat their DFU for each of the three scenarios. The table shows the impact of increasing the proportion of patients using an offloading device from zero to 25 per cent; 25 to 50 per cent; 50 to 75 per cent; and from zero to 75 per cent.

Table 3

Impact of Offloading Devices on the Cost of Diabetic Foot Ulcers in British Columbia (2016)

Change in proportion with access to offloading devices:	Lifetime Probability of DFU = .15				Lifetime Probability of DFU = .20				Lifetime Probability of DFU = .25			
	0 to 25%	25 to 50%	50 to 75%	0 to 75%	0 to 25%	25 to 50%	50 to 75%	0 to 75%	0 to 25%	25 to 50%	50 to 75%	0 to 75%
Number of Persons												
DFU	0	0	0	0	0	0	0	0	0	0	0	0
Amputations	-84	-84	-84	-253	-64	-64	-64	-191	-43	-43	-43	-129
Premature Deaths	0	0	0	0	0	0	0	0	0	0	0	0
Millions of 2016 Dollars												
Total Cost	-$8.1	-$8.1	-$8.1	-$24.3	-$6.9	-$6.9	-$6.9	-$20.7	-$5.7	-$5.7	-$5.7	-$17.1
Direct	-$9.6	-$9.6	-$9.6	-$28.8	-$8.9	-$8.9	-$8.9	-$26.8	-$8.2	-$8.2	-$8.2	-$24.7
Indirect	-$0.5	-$0.5	-$0.5	-$1.6	-$0.7	-$0.7	-$0.7	-$2.2	-$0.9	-$0.9	-$0.9	-$2.7
Offloading Devices Cost	$2.1	$2.1	$2.1	$6.2	$2.7	$2.7	$2.7	$8.2	$3.4	$3.4	$3.4	$10.3
Average Cost per DFU ($)												
Total Cost	-$1,631	-$1,631	-$1,631	-$4,892	-$1,043	-$1,043	-$1,043	-$3,130	-$691	-$691	-$691	-$2,072
Direct	-$1,936	-$1,936	-$1,936	-$5,808	-$1,348	-$1,348	-$1,348	-$4,045	-$996	-$996	-$996	-$2,987
Indirect	-$110	-$110	-$110	-$331	-$110	-$110	-$110	-$331	-$110	-$110	-$110	-$331
Offloading Devices Cost	$415	$415	$415	$1,246	$415	$415	$415	$1,246	$415	$415	$415	$1,246

The number of persons with a DFU is not affected by the increased use of offloading devices; improvements in diabetes management, screening and foot care are needed to reduce the prevalence of DFU. However, increasing the proportion of persons using an offloading device by 25 per cent reduces the number of lower limb amputations by between 43 and 84 depending on the lifetime probability of suffering from a DFU.

The improvement in patient outcomes reduces the total cost of DFU by between $5.7-8.1 million in 2016 for each 25 per cent increase in the use of offloading devices. Direct costs fall between $8.2-9.6 million but are partially offset by spending of between $2.1-3.4 million on offloading devices. The estimated reduction in indirect costs from morbidity and premature mortality with each 25 per cent increase in use is between $0.5-0.9 million in 2016.

In summary, provincial funding of offloading devices is likely to increase the use of these devices to up to 75 per cent of patients with DFU. Offloading devices cost an average of $1,425 per person plus the cost of orthotist visits for a total of between $6.2-10.3 million a year. Other associated direct health-care costs are, however, expected to fall by between $2,987 and $5,808 per DFU for a total reduction of between $25-29 million a year yielding a substantial net saving for the government of between $14-23 million a year: a reduction of between 12 and 23 per cent over one year. Indirect costs from morbidity and premature mortality are expected to fall also by about $330 per DFU for a total of between $1.6-2.7 million.

The results of this analysis address cost implications of public funding for offloading devices for healing DFU, but other issues remain. Strategies on how to prevent relapses of ulceration after the ulcer has closed, including the use of orthotics and orthopaedic foot wear as well as ongoing maintenance foot care should be explored. Equally important is the prevention of initial ulceration through self-foot checks and regular foot care from health professionals. Further work needs to be completed to describe the cost-effectiveness for these interventions in British Columbia. These issues are extremely important but were beyond the scope of the present analysis.

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