



## The Diabetic-Foot Online Clinic Utilization Score (DFOCUS): A calculator for estimating clinic volume and utilization



John D. Miller, Nicholas A. Giovinco, Joseph L. Mills, David G. Armstrong\*

*Southern Arizona Limb Salvage Alliance (SALSA), Department of Surgery, University of Arizona College of Medicine, United States*

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### ABSTRACT

The goal of this manuscript is to suggest the utilization of pre-existing population data to provide a functional tool for health systems and administrators to best estimate and plan resource utilization when building or refining a diabetic foot clinic. The system allows one to predict the number of expected risk-category specific visits from a local community in a given year. It is our hope that this system will aid health care providers in administrative planning and overhead. The calculator is hosted at <http://www.diabeticcalculator.com> as a free to use operation.

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### 1. Introduction

Classifying categories of risk for lower extremity complications of diabetes has been an ongoing goal for clinicians and clinical researchers. In 2008, the ADA convened a task force to consolidate the scientific evidence and develop a more refined guideline [1–6]. Since then, international teams have established universal systems with the hopes of standardizing patient care, data collection, and the allocation of resources [7].

The DFOCUS calculator functions by using one of two initial data points depending on the familiarity of the physician with his or her patient population. For the most general use, the calculator begins with the user insertion of an estimation of the surrounding population. This starting point is converted to a base number of patients with diabetes. According to the American Diabetes Association (ADA) the national average of patients in the United States with diabetes is approximately seven percent. This figure is the default variable in our calculator and is editable by the user for local refinement (Fig. 1).

The second, optional, starting point for the DFOCUS system is for physicians who are more familiar with the size of their diabetic population. Following this entry point, the calculator shares the remaining calculations with the first origin. We believe this additional option will be helpful to an individual or system who already has an established concept of the diabetic population in his

or her area, yet seeks further information about the breakdown of risk categories and the likelihood for patients in a particular risk category to develop ulceration. This dual modality maximizes the utility of the algorithm while maintaining its overall simplicity.

After defining the number of diabetic patients in a given area, the calculator continues to break down the number of patients with diabetes into their separate risk strata. The distribution of patients in the reference population was based on data derived from Lavery and coworkers 42.3% low risk, 15.1% risk 2, 28% risk 3, 14.6% high risk patients [8]. Using this stratification, we factor in the suggested number of screening and prevention visitations for each risk category as proposed by [9]. The full breakdown of patients in each risk category and their calculated ideal visitation totals are included on-screen for the most effective planning [10].

After sorting the population into respective risk strata, the calculator is able to predict the number of ulcerations which will develop within each risk category [8]. The estimate of patients who will develop a wound is displayed, along with the number of visitations these new developments will create. Based on calculations using previous data from Margolis and coworkers, we estimated a median time to healing of approximately 20 visits [11]. Using this computation, the physician now has the ability to see an estimate for the number of visitations that would require resources specific to wound care. Combining the totals for both preventive screening and wound care visits finalizes the calculations for the average annual visitations to a physician.

While the precision of most predictive algorithms for biological processes cannot be guaranteed, the accuracy of this system will be continually improved by the integration of new population data,

\* Corresponding author.

E-mail addresses: [john.d.miller@dmu.edu](mailto:john.d.miller@dmu.edu) (J.D. Miller), [Armstrong@usa.net](mailto:Armstrong@usa.net) (D.G. Armstrong).

### D-FOCUS Visitation Calculator:

Calculate by area population:

Enter the surrounding population:

Prevalence of diabetes:  (On average, 7% of the general population is diagnosed with diabetes. <sup>1)</sup>

Approximate # number of diabetic patients:

Number of screening and prevention visits: <sup>2</sup>

Estimated number of new ulcerations:

Number of wound care visits:  (Assuming 20 visits per ulceration as average time to healing)

Total estimated annual visitations:  (Annual visitations from patients with diabetes including additional wound care visits)

**References:**

[1. Economic Cost of Diabetes in the US 2012 - ADA](#)

[2. Comprehensive Foot Examination and Risk Assessment - Boulton & Armstrong](#)

[3. Reevaluating the Way We Classify the Diabetic Foot - Lavery & Peters](#)

[4. Prevention of Diabetes-Related Foot Ulcers and Amputations: a Markov Model - Tennvall](#)

[5. 2011 National Diabetes Fact Sheet - CDC](#)

**Or:**

Calculate by # of diabetic patients:

Enter the number of patients with diabetes:

(Please use 'Reset' button below to avoid entering data into multiple columns)

**Breakdown by Risk Group: <sup>3</sup>**

	Patients:	Visits:
Risk 0:	0	0
Risk 1:	0	0
Risk 2:	0	0
Risk 3:	0	0

Fig. 1. A screenshot of the DFOCUS calculator as of 12/8/13.

and with the inclusion of additional facets of complication. Potential future additions to the formulae include; the propensity for patients to shift into new risk states as identified by Tennvall [2]; the ratio of patients in each risk category who will take advantage of podiatric care [2]; and the likelihood for patients to be lost to follow-up or to seek other physicians for their care. Data from the CDC 2011 fact sheet will also aid in improving the accuracy of this device, as a practitioner in the US will be able to search by State and County for the prevalence of diabetes in his or her practice area [12]. Following this step, the addition of similar international data will significantly increase the specificity of this device as it will utilize local data points rather than blanket averages.

## 2. Conclusion

Using data from these attempts to classify diabetic patients and other resources, we have assembled a simple, free to use algorithm which we hope will best benefit the healthcare community by predicting the number of diagnosis specific visitations to a dedicated practitioner or comprehensive foot/wound care service within a given year.

This tool requires a modern browser with javascript enabled, in order to calculate information. This operation is performed within the browser session itself, and is not outwardly transmitted; therefore, no information is disclosed or outwardly shared. It is our hope that this easy to use calculator will aid a physician in best allocating their resources by breaking a general population of patients down into their relative categories of risk, and linking this to their number of average yearly podiatric visitations. This useful calculator, termed the DFOCUS module, will remain readily available and free-to-use at the URL: [www.diabeticcalculator.com](http://www.diabeticcalculator.com).

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