

Describing the use of a cost effective online tool to qualify the geographic location of patients served by an outpatient oncology center

Abstract

At MD Anderson's outpatient cancer center in Sugar Land, Texas, we sought to evaluate the utility of obtaining consent during a separate clinic appointment the day prior to chemotherapy infusions. However, there was some apprehension regarding the length of travel that many patients would have to undertake in order to visit our clinic on two separate days. We sought to use geo-coding techniques to qualify where our patients lived in relationship to our center, but were frustrated by the cost and complexity of existing options, especially at a center without statistics or information analysis support. Here, we describe a technique of using easy, readily available, and free online tools (Google Fusion Tables) to generate data that is accessible to any community clinic with limited resources.

Keywords: geo-coding, google's fusion, epidemics, drug resistance, cancer incidence

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Introduction

At the MD Anderson Sugar Land Cancer Center (a fully outpatient ambulatory center), in an effort to minimize same-day delays in starting chemotherapy infusions, we sought to evaluate the utility of obtaining consent during a separate appointment the day prior. If the patient was agreeable to this split-day approach, we applied the same scheduling to their subsequent treatments, assessing hematopoietic and constitutional readiness for chemotherapy the day prior to infusion. Pre-preparation of chemotherapy can be an effective method of reducing chemotherapy wait times, especially if doses have already been adjusted to account for toxicities, shifts in efficacy, changes in patient body surface area, or other factors that determine the amount of drug to be administered.¹ However, there was some apprehension from the clinical staff regarding the length of travel that many patients would have to undertake in order to visit our clinic on two separate days.²

We sought to qualify further where our patients lived in relationship to our center, and what percentage lived within a reasonable driving distance. Geo-coding, the process of converting textual information (addresses) into geographic coordinates has been frequently used in public health/epidemiological research and practice.³ However, this process can be inaccessible to physicians working in community clinics without access to statistics or information systems personnel familiar with data sorting and coding. Some of the more powerful software available has hefty startup and recurring monthly fees that make implementation less practical for limited use. We sought a solution that was easy, reliable and cost effective for community physicians to use from their existing computer or laptop. Here, we describe a simple technique of using readily available and cost-effective online tools from Google to generate these data.

Methods

Generating the data needed was possible with readily available software and was relatively simple to perform. Here we describe the general approach:

1. Generate an Excel Spreadsheet with two columns. The first column should contain a unique patient identifier such as a medical record number. The second should contain the patient's primary zip code. This data should be double-checked to ensure no duplicates are generated. Before analyzing, the unique patient data should be de-identified to letters or numbers (i.e. A,B,C,D,...), while keeping the zip codes intact. This will ensure HIPAA compliance.
2. Go to Google Fusion Tables.⁴
3. Select 'Create A Fusion Table' to begin and you will be prompted to import data.
4. You can select 'From This Computer' on the left and click 'Choose File' to select and import the excel file with the zip codes.
5. Click 'Next' and select the row which has the column names.
6. Click 'Next' and change the Fusion Table name and description if needed.
7. Click 'Finish' and the Fusion Table will appear as a spreadsheet document.
8. Click 'Edit' and choose 'Change Columns'.
9. Select the column with zip codes on the left and change the type to 'Location'.
10. Click 'Save' which will return to the Fusion Table with the zip codes highlighted in yellow. This means the zip codes can now be geo-coded (Figure 1).
11. Geo-coding is the process of converting a location like addresses or zip codes into geographic coordinates compatible with maps. To do this, click 'File' and select 'Geo-code' make sure the location column is the column with zip codes and press 'Begin Geo-coding' (The free Fusion Tables only geo-codes up to 2,500 locations per day, so values can be geo-coded over multiple days if needed).

12. Now, press the orange “plus sign” next to the tabs at the top and select ‘Add Map’.
13. At the left you can change between a feature map and a heat map as well as change the settings.

Sample Zip File
This is a sample file with no real patient data
Edited at 3:39 PM

File Edit Tools Help Rows 1 Cards 1

Filter No filters applied

1-10 of 10

MR#	Zip
123456-0	77479
123456-1	77030
123456-2	77478
123456-3	77479
123456-4	77478
123456-5	77702
123456-6	77832
123456-7	77971
123456-8	78106
123456-9	76240

Figure 1 Fusion Table with Zip Codes highlighted in yellow.

Results

Using our unique data within Google’s Fusion Tables, we were able to generate both a feature map as well as a heat map (Figure 2&3). Qualitative analysis of the heat maps generated above revealed that a significant proportion of patients lived within a 15-mile radius of our center.

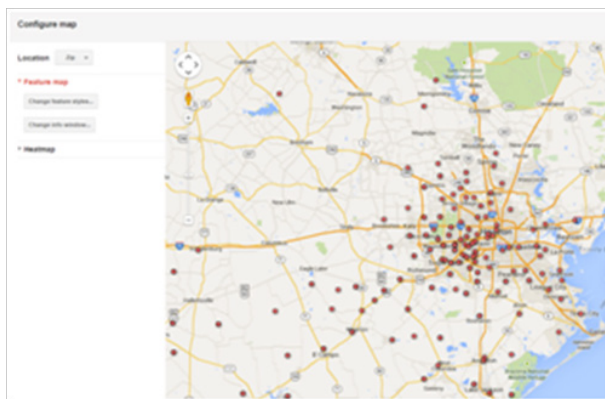


Figure 2 We used Google’s Fusion Tables to generate feature map of the primary addresses of our patients.

Discussion

Geo-coding is the process of encoding textual data into visual geographic coordinates or map. This technique has been used for many years by population health scientists and epidemiologists to gain insight into the role of complex factors on areas of study such as infection epidemics, drug resistance, cancer incidence, as well as socioeconomic and racial disparities.⁵⁻⁸ However, accessing existing geo-coding software can be intimidating from both knowledge and cost perspective basis, which may be why it has not been used more frequently in smaller settings like outpatient medical clinics. We have demonstrated that given easily accessible methods like Google Fusion Tables, geo-coding can be used to analyze data on a smaller scale with clear practical benefits. In our clinic, we have used the information

gleaned towards better tailoring the patient experience as well as improving clinical workflow.

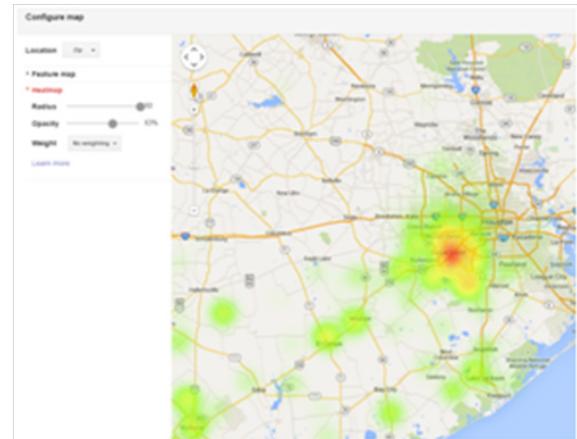


Figure 3 We used Google’s Fusion Tables to generate heatmap of the primary addresses of our patients.

In our example, analysis revealed that a large proportion of our patients lived within 15miles from MD Anderson Sugar Land. This represented a sizeable group that could be offered the option of undergoing chemotherapy consent a day earlier than the scheduled infusion. The same scheduling template could then be applied to subsequent infusions for patients on therapy. This could potentially allow for pre-preparation of chemotherapy as well as minimization of any delays related to clinic backups in initiating infusions. Eliminating these delays has allowed us to adequately obtain and document patient consent, which is a large part of the American Society of Clinical Oncology’s quality improvement initiatives (ASCO QOPI) certification standards.⁹ It has also improved our patient’s level of satisfaction, which may have implications for future Medicare reimbursement.¹⁰ Due to the results of this preliminary data, we have currently embarked on a more formal study of scheduling strategies to optimize patient flow in our clinic, and plan to report those data in the near future.

Acknowledgments

None.

Conflicts of interest

Authors declare there are no conflicts of interest.

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