Developing Visualizations for Health Workforce Data

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Why visualize your data?

Allow users to:

- more easily see and explore patterns in the data

- engage with rich or complex datasets without having to do programming

- customize graphics (line charts, maps and pop pyramids) to tell policy story for different professions, specialties or geographic areas

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Who uses data visualizations?

External

- Policymakers
- Researchers
- Health Professionals
- Educators
- Employers
- Reporters
- Grant writers and funders

Internal

- Your team
  - Auditing data
  - Developing new research questions
  - Reducing data requests

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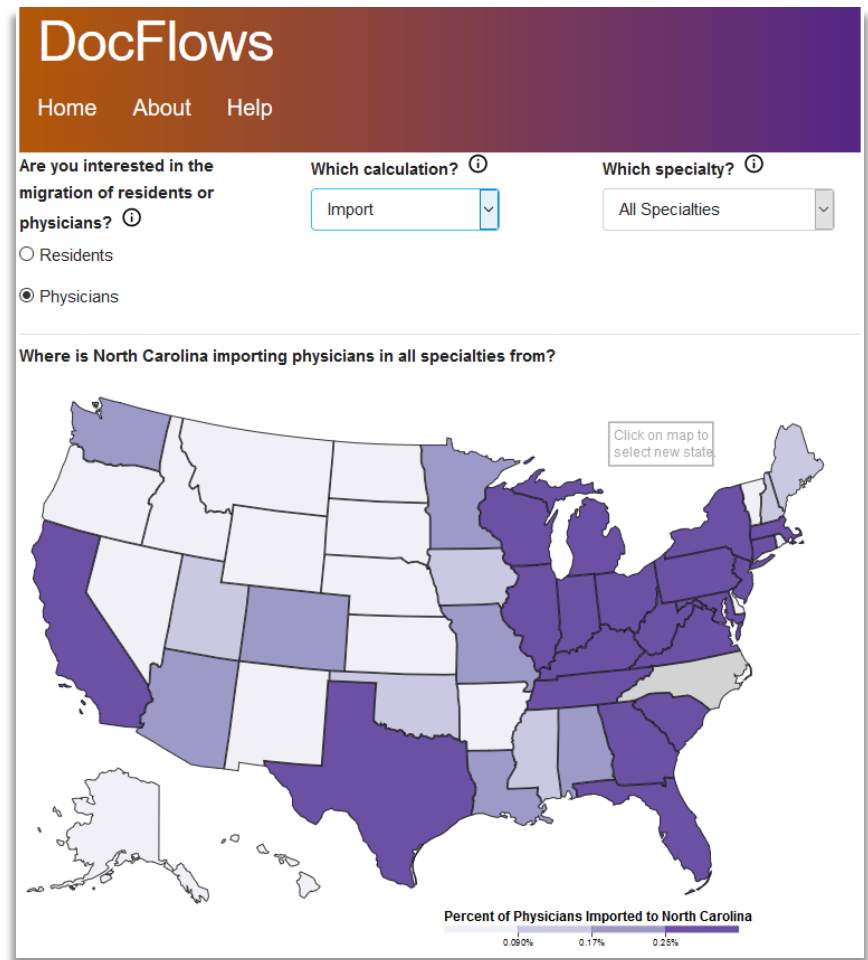
Today: two examples

DocFlows

- An interactive tool to understand physician migration patterns between states

- Funded by the National Center for Health Workforce Analysis in HRSA

NC Health Workforce

- Demographic and geographic data on 19 licensed health professions in North Carolina

- Converted hard copy data book to online visualization

- Funded by NC AHEC

Example 1: DocFlows App

- Data visualization tool allows users to query, download and share maps/graphs of interstate moves by residents and actively practicing physicians in 35 specialties

- Data can be used by state and federal policy makers to understand where their physician workforce is trained and where their trainees are moving
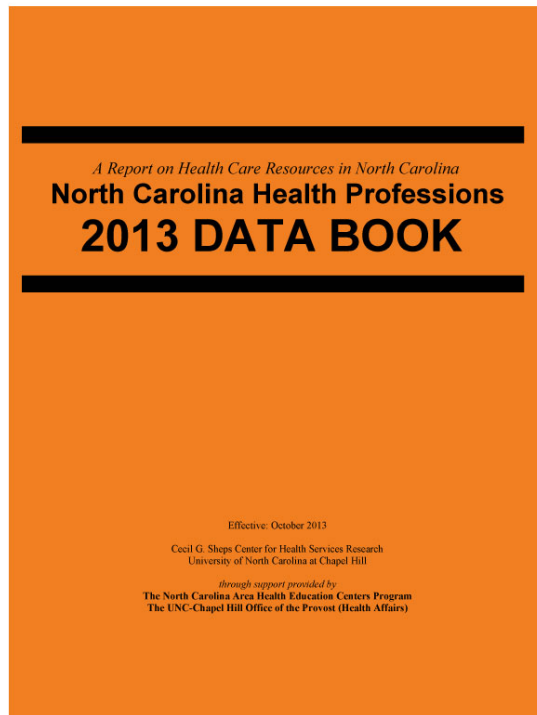
Demo: DocFlows

http://docflows.unc.edu/

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Example 2: NC Health Workforce

A Report on Health Care Resources in North Carolina
North Carolina Health Professions
2013 DATA BOOK

Effective: October 2013

Cecil G. Sheps Center for Health Services Research
University of North Carolina at Chapel Hill

through support provided by
The North Carolina Area Health Education Centers Program
The UNC-Chapel Hill Office of the Provost (Health Affairs)

Durham

MSA county designation: Metropolitan   **AHEC Region: Wake AHEC**

■ 2013 ACTIVE HEALTH PROFESSIONALS* ■

Physicians §

Non Federal Physicians	2,131
Primary Care Physicians	525
Family Practice	*65*
General Practice	*5*
Internal Medicine	*156*
Obstetrics/Gynecology	*34*
Pediatrics	*124*
Other Primary Care	*141*
Other Specialties	1,606
Physicians per 10,000 Population	74.5
Primary Care Physicians per 10,000 Population	18.4
Federal Physicians**	159

Dentists and Dental Hygienists

Dentists	203
Dental Hygienists	142

■ DEMOGRAPHICS ■

Nurses

Registered Nurses	6,851
Nurse Practitioners	*409*
Certified Nurse Midwives	*12*
Licensed Practical Nurses	627

Other Health Professionals

Chiropractors	50
Occupational Therapists	191
Occupational Therapy Assistants	46
Optometrists	38
Pharmacists	738
Physical Therapists	355
Physical Therapist Assistants	32
Physician Assistants	333
Podiatrists	10
Practicing Psychologists	289
Psychological Associates	32
Respiratory Therapists	240

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Example 2: NC Health Workforce

**Nurse Practitioners per 10,000 Population
North Carolina, 2014**

Nurse Practitioners per 10,000 Population
(# of Counties)

9.55 to 17.63	(5)
5.40 to 9.54	(14)
2.12 to 5.39	(64)
0.20 to 2.11	(14)
No Active NPs	(3)

NC = 5.40 per 10,000 Population
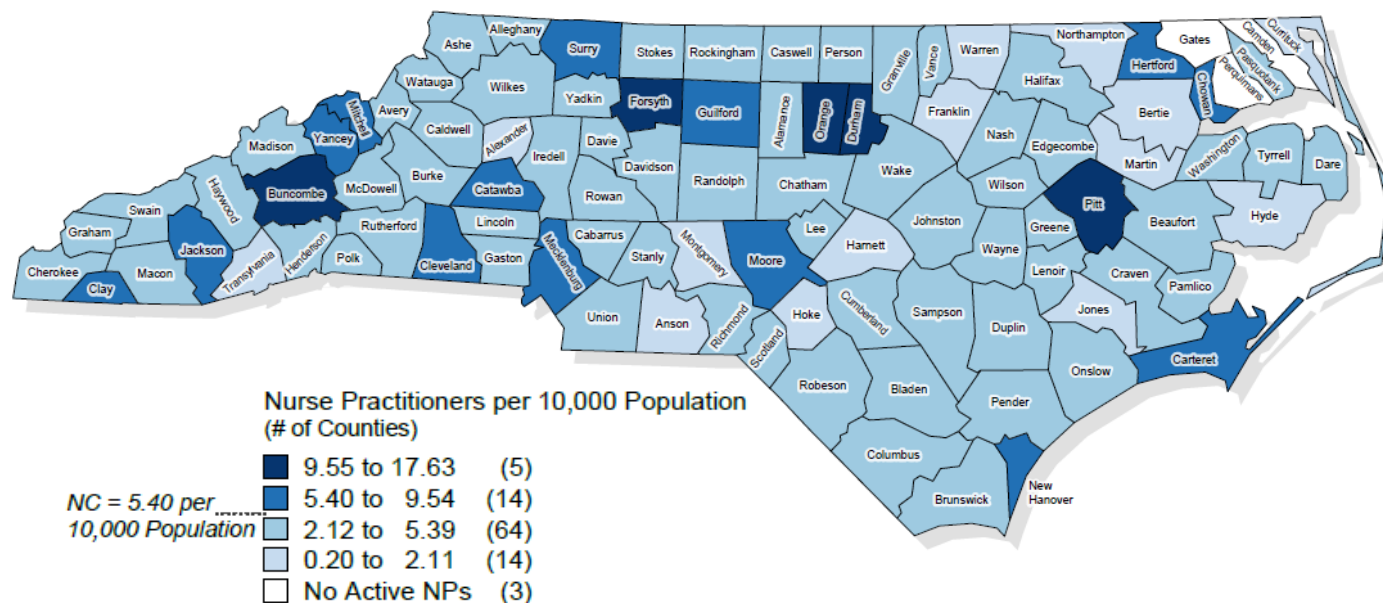
N = 5,372

Note: Data include active, instate NPs licensed in North Carolina as of October 31, 2014.
Source: North Carolina Health Professions Data System, with data derived from the North Carolina Board of Nursing, 2014.
Produced by: Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

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We wondered how we could increase access to and interest in the data

- Put data online
- Make it interactive
- Allow people to download images and data
- More maps!
- Add new dimensions to data
  - Longitudinal data
  - Specialties
  - Demographic data (age, sex, underrepresented minorities)

Demo: NC Health Workforce

https://nchealthworkforce.sirs.unc.edu/

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General considerations for developing data visualizations

- Who is audience: external or internal users?

- How important is the security of your data?

- How many users do you expect?

- How much can you spend?

- What is your internal technical expertise?

- How important is longevity?

- How much flexibility or customizability do you need?

- Is it going to be responsive/mobile-friendly?

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Quick advice on platforms/technologies

- Want something easy to use? Tableau

- Have general internal expertise in web development?
  Use one of the myriad javascript charting libraries and something like Leaflet or DataMaps for mapping

- Happen to have internal expertise in R?
  Check out R Shiny, ggplot2, and related packages

- Want high customizability and good performance? d3.js

Challenges

- Getting users – Don't forget dissemination and tutorials

- 'Just give me the data' – allow downloads if possible

- When to say 'no' (feature creep)

- Interactivity is important but tricky to get right

- Sane defaults and charts across diverse data (much different than making a single chart or map)

- Human readable chart text and explanations

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Resources: Why start from scratch?

Design and Code

- https://bl.ocks.org/

- http://www.r-graph-gallery.com/

- https://d3js.org/

- https://dc-js.github.io/dc.js

- https://vega.github.io/vega/

- http://rawgraphs.io/

Design

- https://public.tableau.com/en-us/s/gallery

- http://www.visualisingdata.com/

- https://flowingdata.com/

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