HRSA Ryan White HIV/AIDS Program
CENTER FOR QUALITY IMPROVEMENT & INNOVATION

Data Stratification and Analysis

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Learning Objectives

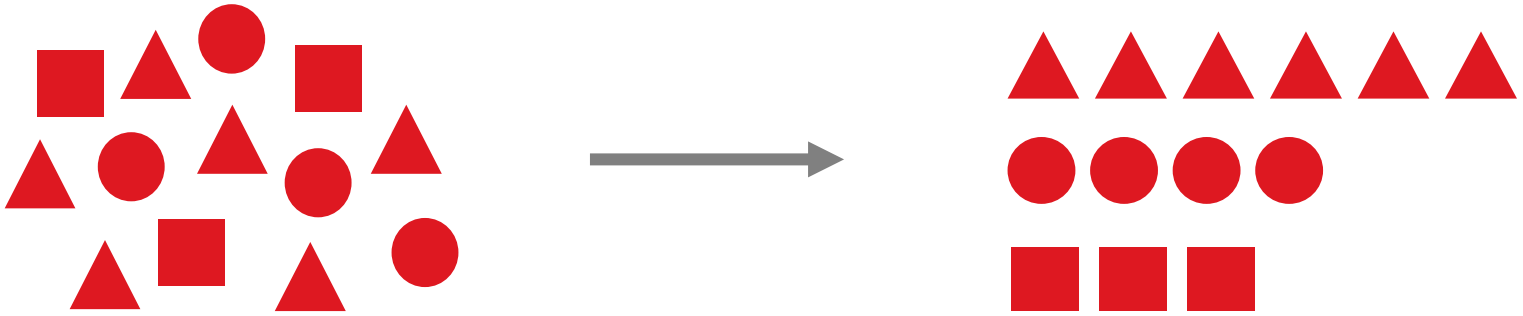
Learners will be able to:

1. Define data stratification and analysis.
2. Describe a step-by-step approach to implement data stratification for quality improvement and care planning.
3. Identify common tools to collect, organize, and analyze stratified data.
4. Identify actions to take based on data stratification and analysis work.

What are you hoping to learn today?

What is data stratification?

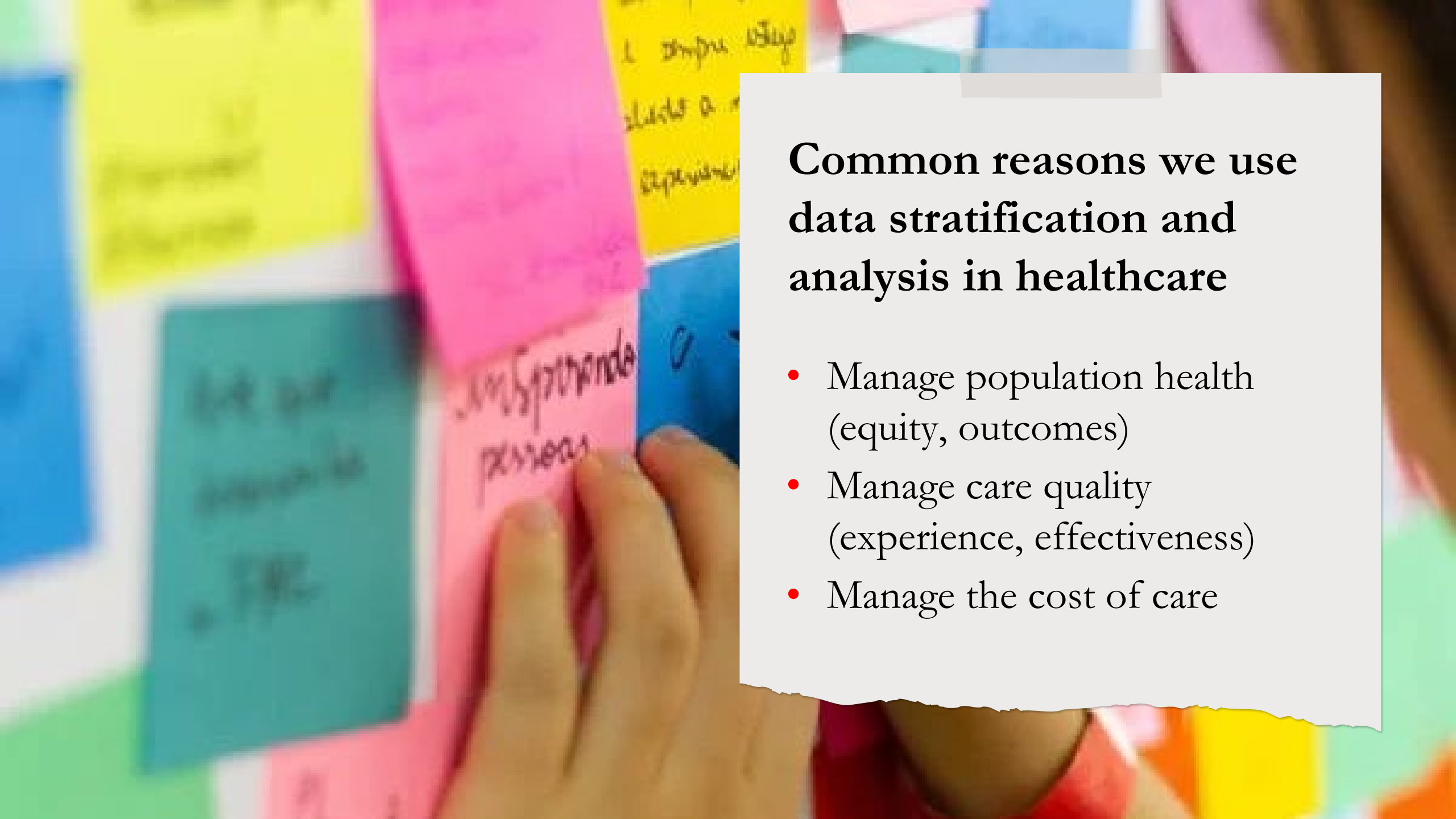
The process of sorting data based on same, or similar, characteristics.



Data stratification and analysis

Data stratification and analysis allow us to organize data and information to better understand processes in our systems as well as individual and population needs, risks, and barriers for the **purposes of equitably improving health outcomes, experiences of care, and value.**

What experiences do you have with data stratification and analysis?

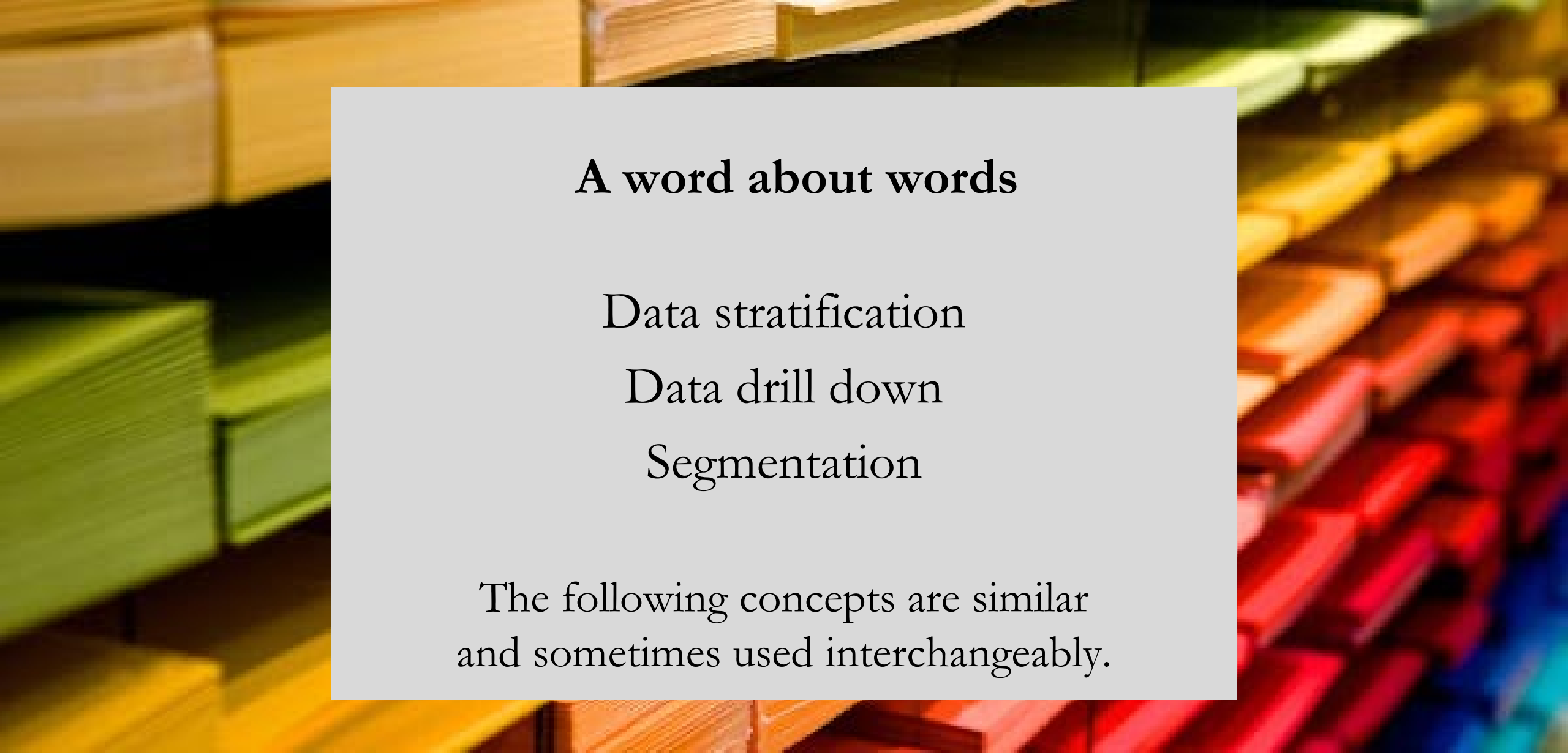


Common reasons we use data stratification and analysis in healthcare

- Manage population health (equity, outcomes)
- Manage care quality (experience, effectiveness)
- Manage the cost of care

What are examples of data that can be stratified?

Demographics data	Geographical data	Health status data	System quality data	Economic/cost data
Age groups (18-24, 25-34, etc.), gender, ethnicity/race, religion, income level, education level, housing status	Urban/rural, state, county, socio-political region, city, country	Disease status (viral suppression, number of chronic conditions, severity), health behaviors (smoking), treatment type	Meeting guidelines (linked, retention, cancer screening), effective care and treatment (viral suppression, lipids), experience, satisfaction	Cost of care (avoidable Emergency Department visit), utilization, value



A word about words

Data stratification

Data drill down

Segmentation

The following concepts are similar and sometimes used interchangeably.

DATA STRATIFICATION & ANALYSIS

STEP BY STEP

How to implement data stratification and analysis?

1

Clarify the purpose

What are you trying to accomplish?

- Solve a problem?
- Research or learning?
- Close a quality gap?
- Identify priorities?
- Test assumptions?

Idea generator: Sample questions to guide data stratification

- What age groups are most likely to be out of care?
- Are there population demographics associated with people behind on their labs?
- If people have a great experience with our care, are they also more likely to achieve viral suppression?
- What cultural safety programs should we invest in to meet the needs of the population we serve?
- Are clients with multiple chronic conditions more likely to be up to date on routine vaccinations?

Idea generator: Sample questions to guide data stratification (continued)

- Who needs a reminder for cervical cancer screening so that we can customize our outreach communications?
- What zip code is associated with the most Emergency Department visits in the last year?
- Who needs case management services to reach viral suppression?
- Is patient experience associated with lower rates of viral suppression?
- What partners refer the most patients to us?

Data stratification and analysis action plan (example)

Start date:

End date:

Purpose	This is importance because
We want to improve retention in care at our clinic. We are aware some clients are not consistently coming in for care and we don't always know who or why.	Retention in care is associated with better viral suppression and better health outcomes.

Tasks	Completed by
1.	
2.	
3.	

How to implement data stratification and analysis?

2

Identify stratification criteria

- Identify key variables that are related to your purpose
- Manage the scope of your analysis (research vs. quality improvement) as you iterate between deductive and inductive thinking

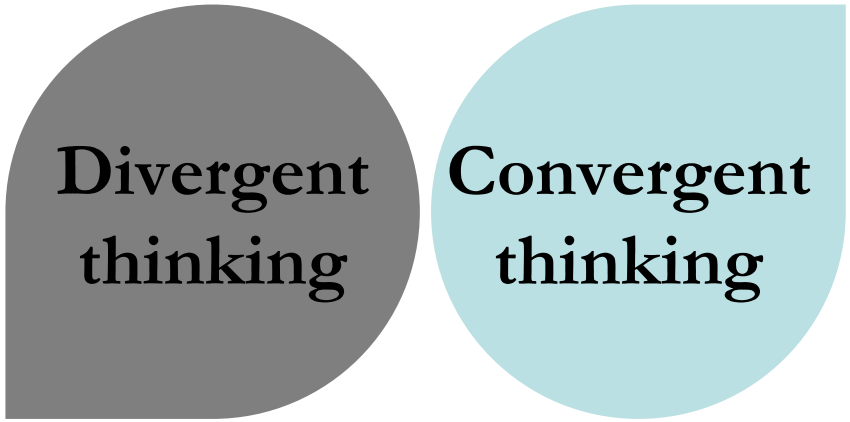
Example: Data stratification plan

Stratification criteria

- Age groups (18-24; 25-34, etc.)
- Gender
- Race/ethnicity
- Zip code
- Self-reported reasons for no visits last year (survey)
- Number of chronic conditions
- Emergency Department visits last year
- Cost of care
- Viral suppression

More about selecting stratification criteria

- Generating lists of ideas
  - Free-flowing open discussion
- Creativity and diverse viewpoints
- Suspending judgment



- Sorting ideas into categories
- Summarizing key points
- Drawing conclusions
- Using judgment

How to implement data stratification and analysis?

2 Identify stratification criteria

- Identify key variables that are related to your purpose
- Manage the scope of your analysis (research vs. quality improvement) as you iterate between deductive and inductive thinking
- Use a collaborative approach and decision-making technique (brainstorming, nominal group technique)
- Consider what data do you now want to begin collecting

Data stratification and analysis action plan (example)

Start date:

End date:

Purpose	This is importance because
We want to improve retention in care at our clinic. We are aware some clients are not consistently coming in for care and we don't always know who or why.	Retention in care is associated with better viral suppression and better health outcomes.

Tasks	Completed by
1. Review the list of all HIV clients at our clinic (remove clients with documentation of having moved or gone elsewhere)	Iman
2. Stratify client data: (1) retained in care and (2) not retained in care. For each group, compare (stratify) (a) age groups, (b) gender, and (c) number of chronic conditions. Analyze using a histogram.	Phil
3. Decide on next steps (e.g., add more criteria? Perform root cause analysis?)	Ange

How to implement data stratification and analysis?

3

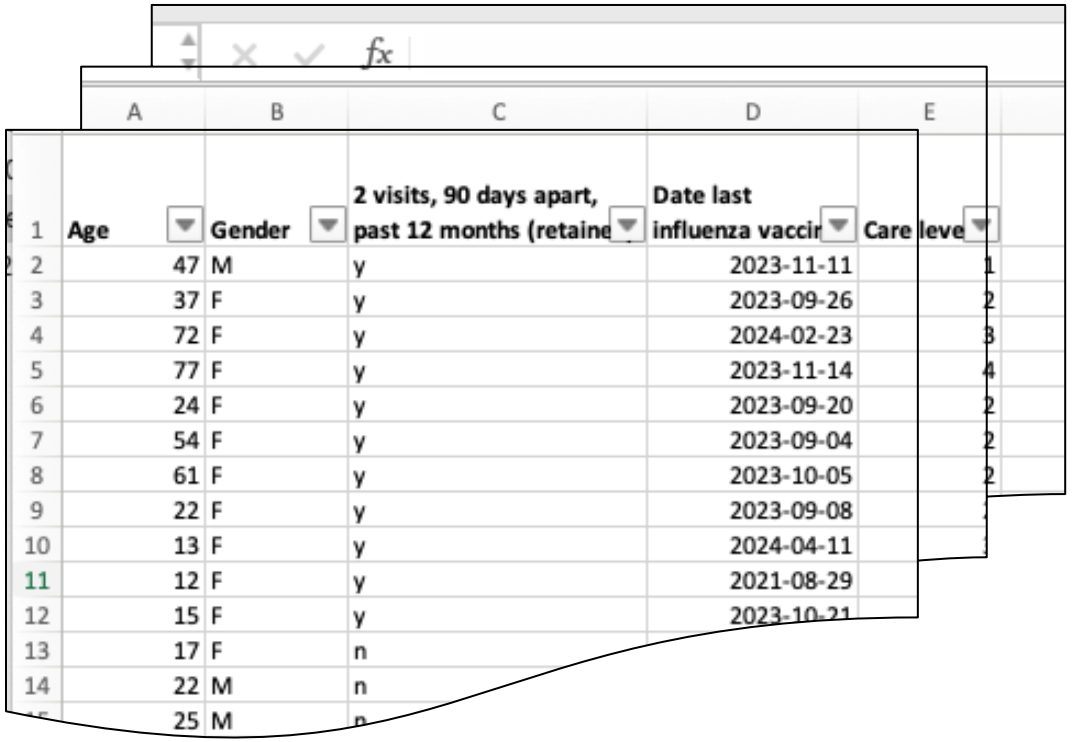
Collect, organize, and analyze data

- Use a tool (e.g., spreadsheet, software solution) to collect, organize, and analyze relevant data
- Apply stratification criteria and choose an appropriate graphical tool to visualize stratified data

Tools to collect, organize, sort, and analyze data

- Spreadsheets (e.g., Excel
  - Import or manually add data
  - Simple tables or pivot tables

- Software (e.g., Microsoft Power BI, electronic medical records, Tableau, other)
  - Integrate or import data
  - Build in filters for stratification criteria

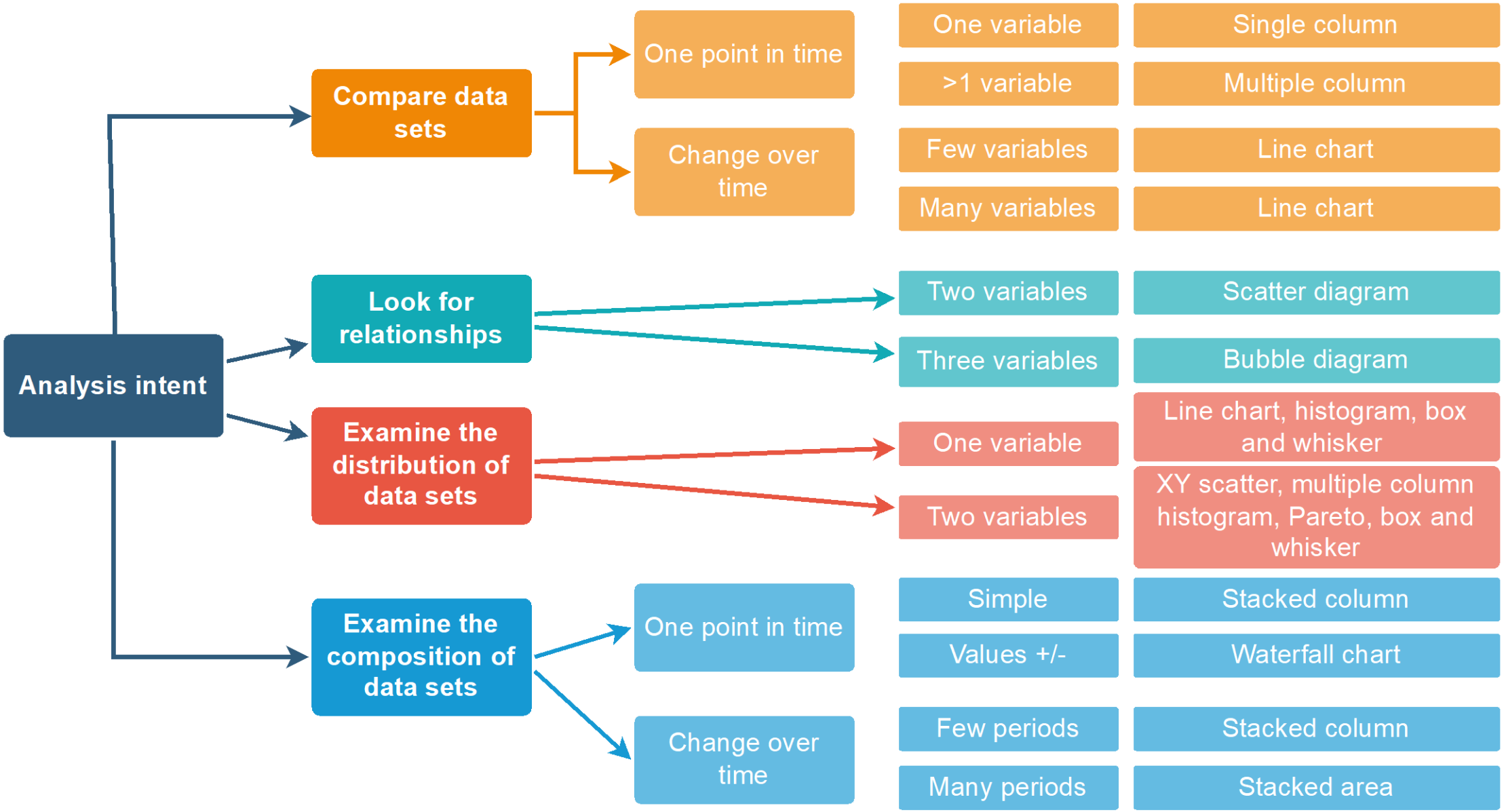


	A	B	C	D	E
1	Age	Gender	2 visits, 90 days apart, past 12 months (retaine	Date last influenza vaccir	Care leve
2	47	M	y	2023-11-11	1
3	37	F	y	2023-09-26	2
4	72	F	y	2024-02-23	3
5	77	F	y	2023-11-14	4
6	24	F	y	2023-09-20	2
7	54	F	y	2023-09-04	2
8	61	F	y	2023-10-05	2
9	22	F	y	2023-09-08	
10	13	F	y	2024-04-11	
11	12	F	y	2021-08-29	
12	15	F	y	2023-10-21	
13	17	F	n		
14	22	M	n		
	25	M			

Choosing a graphical tool to display your data begins with…

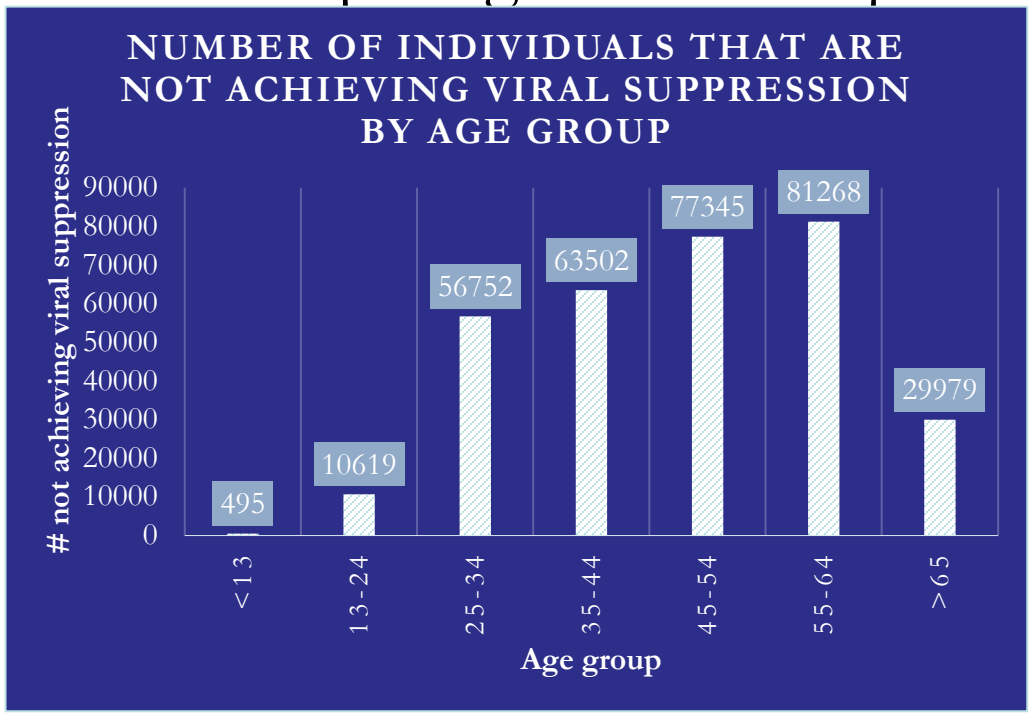
Purpose	Description	Example(s)
Comparison	To understand how one or more data set are similar or dissimilar.	Comparing viral suppression (VS) rate at your clinic with the VS rate with all clinics in your state
Relationships	To understand how changes in one data set affect (or don't affect) changes in another data set.	Client retention + VS Client satisfaction + wait times
Distributions	To understand how a data set is distributed over another variable.	VS across age groupings VS over time across age groupings
Compositions	To understand how a dataset is composed (the parts that make it up).	Risk stratification of a panel of HIV clients, cost of care by service area

Choosing a graphical tool to display your data begins with…



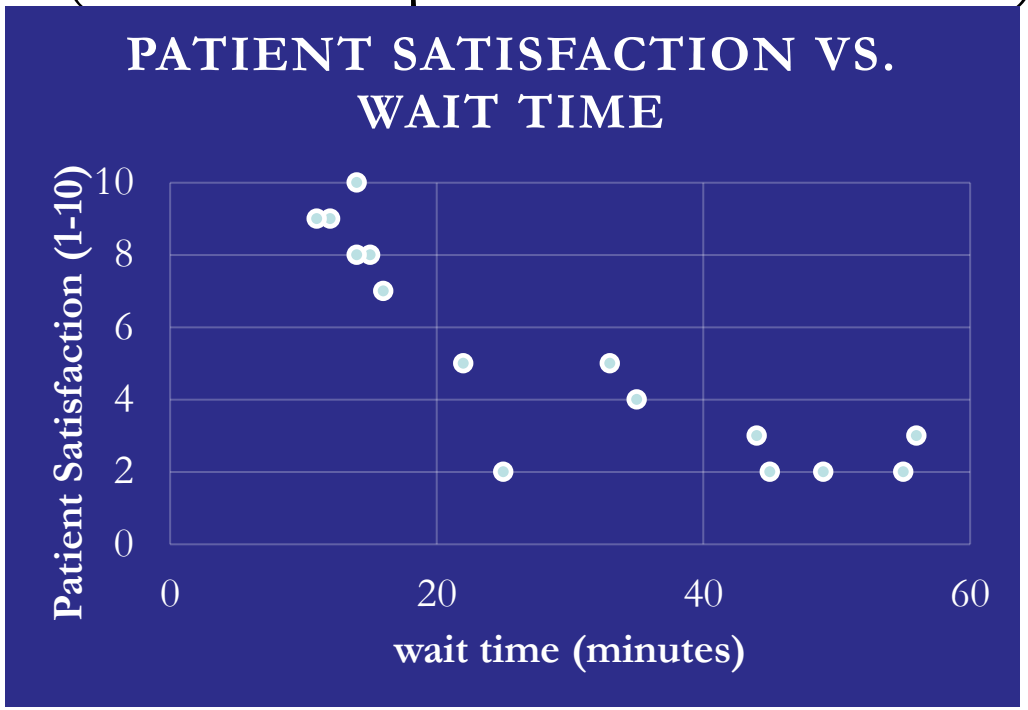
Visualizing stratified data

Histogram (Column)
(Good for comparing relative frequencies)



Criteria: viral suppression (y/n); age group

XY Scatter plot (single variable)
(Relationships between variables)

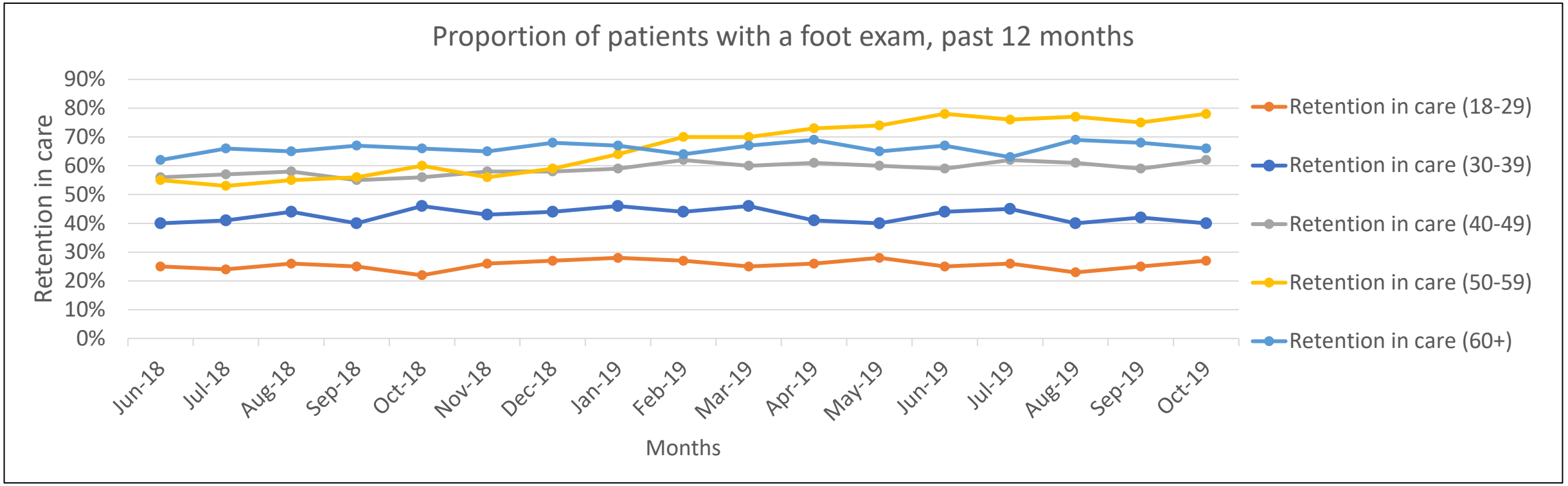


Criteria: Satisfaction (1-10); wait time

Visualizing stratified data

Line chart

(Look for distributions, compositions, and changes over time)



Criteria: retention in care (y/n); age group, time

More ideas on data display (Pareto, two-way tables, etc.)

Drilling down and visualizing data to address barriers

Center for Quality Improvement and Innovation (CQII)
02/16/2024

https://targethiv.org/library/drilling-down-and-visualizing-data-address-barriers?utm_source=bpURL

Using Graphs to Analyze and Share Performance Data

Center for Quality Improvement and Innovation (CQII)
10/26/2023

https://targethiv.org/library/using-graphs-analyze-and-share-performance-data?utm_source=bpURL

How to implement data stratification and analysis?

3

Collect, organize, and analyze data (continued)

- Things that may come up:
  - Identify data to begin collecting (e.g., PHQ-9 scores)
  - Find new stratification criteria to explore
  - You may start wanting to ask about the differences that exist between populations

How to implement data stratification and analysis?

4 Act

- Update your action plan with next steps
- Examples:
  - Further analysis
  - Root cause analysis
  - Begin an improvement project (team, charter, etc.)

Data stratification and analysis action plan (example)

Start date:

End date:

Purpose	This is importance because
We want to improve retention in care at our clinic. We are aware some clients are not consistently coming in for care and we don't always know who or why.	Retention in care is associated with better viral suppression and better health outcomes.

Tasks	Completed by
1. Review the list of all HIV clients at our clinic (remove clients with documentation of having moved or gone elsewhere)	Iman
2. Stratify client data: (1) retained in care and (2) not retained in care. For each group, compare (stratify) (a) age groups, (b) gender, and (c) number of chronic conditions. Analyze using histogram.	Phil
3. Decide on next steps (e.g., add more criteria? Carry out root cause analysis?)	Ange

Data stratification and analysis action plan (continued)

Start date:

End date:

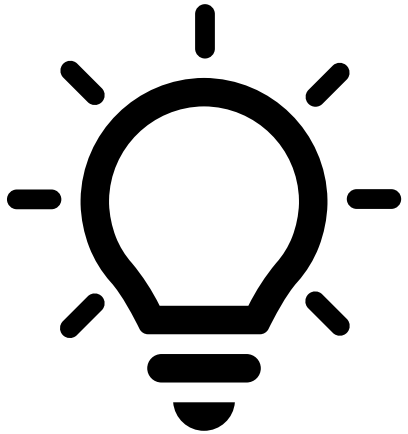
Tasks	Completed by
4. Create a fishbone diagram (root cause analysis) to better understand the reasons that patients aged 24-45 are not retained in care	Ange
5. Begin collecting PHQ-9 scores and screening frequency in electronic medical records	Phil

Check out:

Constructing the Fishbone Diagram Center for Quality Improvement and Innovation (CQII) 10/27/2022 TargetHIV.org

Root Cause Analysis for Quality Improvement
Resource updated 08/17/2023

Other tips



- Start with the data you have
- Can be low tech or high tech
- Start small, learn, and grow

Practical example: Stratification for care planning and delivery

RISK STRATIFICATION

Data stratification and analysis action plan

Start date:

End date:

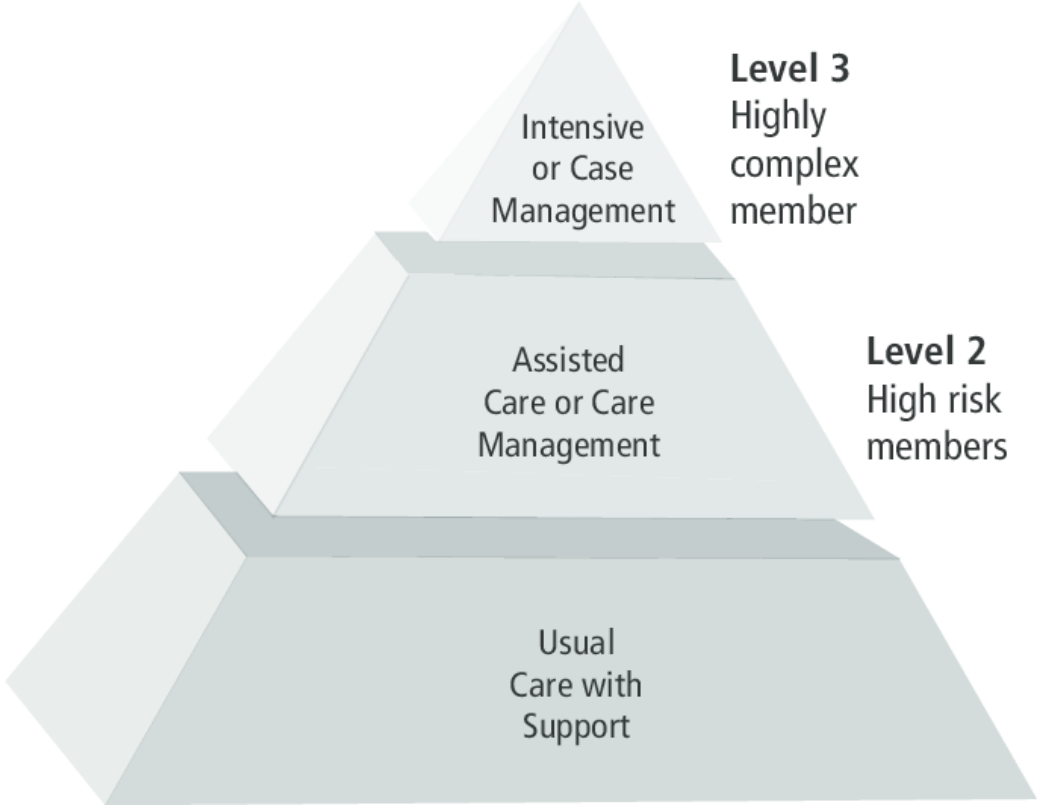
Purpose	This is importance because
Risk stratify our clients to match individual needs, risks and barriers to the right care at the right time.	Our clients have different needs, risks, and barriers. Proactively and regularly assessing those factors will help us to ensure our clients get the right level of care and resources at the right time and ensure we are strategic in terms of how we are deploying our clinic resources.

Tasks	Completed by
1. Assemble a small team to review our clients and use a standardized tool to assign a level of care (risk number)	Fatima
2. Review all risk level 3 clients to ensure they are connected to case management	Steph
3. Review all risk level 1 clients and ensure they are up to date for vaccines	

Risk Stratification

- A process of assigning a risk status to clients
- Risk status is used to plan and manage care and better match resources to individual client needs
- Higher risk clients often get higher levels of care (i.e., more programs, staff, follow-up frequency, etc.)
- Risk stratification also helps to:
  - Strategically allocate or re-allocate scarce resources
  - Promote realistic assessments of staffing and training needs
  - Encourage partnership or the addition of new services

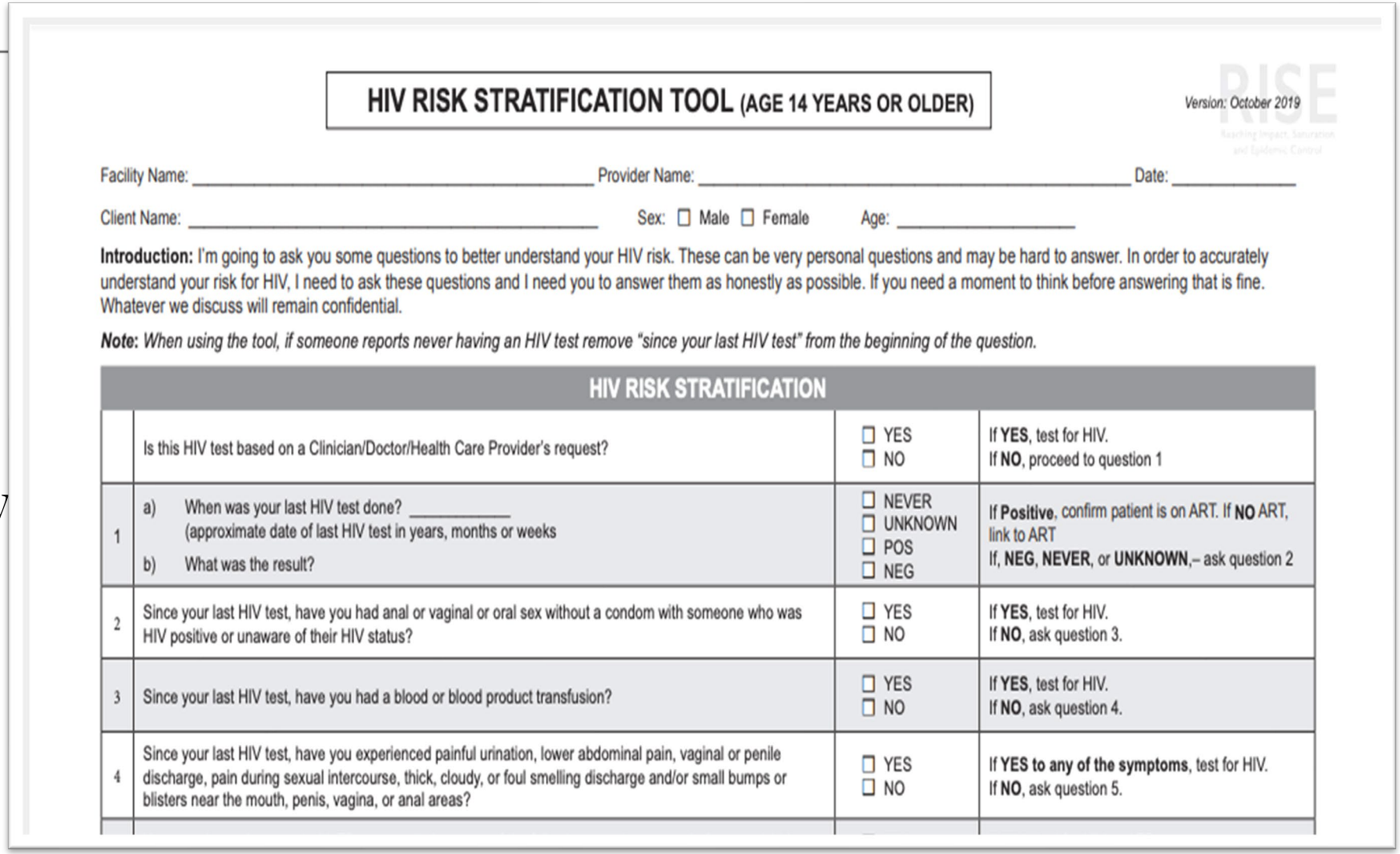
Example: The Kaiser Permanente Pyramid Population Management More than Care & Case Management



- Can be achieved simply (e.g., provider case review, screening tool) or with technological solutions (e.g., Johns Hopkins ACG system).
- In mental health, you might use the "level of care" tool to determine those who need more care.
- In primary care, you might use number of chronic conditions, a behavioral health diagnosis or social determinants of health to determine a risk level.

Barceló, Alberto, Silvana Luciani, Irene Agurto, Pedro Ordunez, Renato Tasca, and Omar Sued. "Improving Chronic Illness Care through Integrated Health Service Delivery Networks." *Pan Am Health Organization. Washington DC.*, January 1, 2012.

Example:
Risk stratification for individual care planning and delivery: to determine eligibility for HIV testing or prophylaxis



HIV RISK STRATIFICATION TOOL (AGE 14 YEARS OR OLDER)

Version: October 2019

Facility Name: _____ Provider Name: _____ Date: _____

Client Name: _____ Sex: ☐ Male ☐ Female Age: _____

Introduction: I'm going to ask you some questions to better understand your HIV risk. These can be very personal questions and may be hard to answer. In order to accurately understand your risk for HIV, I need to ask these questions and I need you to answer them as honestly as possible. If you need a moment to think before answering that is fine. Whatever we discuss will remain confidential.

***Note:** When using the tool, if someone reports never having an HIV test remove "since your last HIV test" from the beginning of the question.*

HIV RISK STRATIFICATION			
	Is this HIV test based on a Clinician/Doctor/Health Care Provider's request?	☐ YES ☐ NO	If **YES**, test for HIV. If **NO**, proceed to question 1
1	a) When was your last HIV test done? _____ (approximate date of last HIV test in years, months or weeks b) What was the result?	☐ NEVER ☐ UNKNOWN ☐ POS ☐ NEG	If **Positive**, confirm patient is on ART. If **NO** ART, link to ART If, **NEG**, **NEVER**, or **UNKNOWN**,– ask question 2
2	Since your last HIV test, have you had anal or vaginal or oral sex without a condom with someone who was HIV positive or unaware of their HIV status?	☐ YES ☐ NO	If **YES**, test for HIV. If **NO**, ask question 3.
3	Since your last HIV test, have you had a blood or blood product transfusion?	☐ YES ☐ NO	If **YES**, test for HIV. If **NO**, ask question 4.
4	Since your last HIV test, have you experienced painful urination, lower abdominal pain, vaginal or penile discharge, pain during sexual intercourse, thick, cloudy, or foul smelling discharge and/or small bumps or blisters near the mouth, penis, vagina, or anal areas?	☐ YES ☐ NO	If **YES to any of the symptoms**, test for HIV. If **NO**, ask question 5.

https://cquin.icap.columbia.edu/wp-content/uploads/2022/08/RISE-Nigeria_HIV-Risk-Stratification-Tool.pdf

Example:

Use of a HIV-risk screening tool to identify optimal candidates for PrEP scale-up among men who have sex with men in Toronto, Canada: disconnect between objective and subjective HIV risk

HIRI-MSM Risk Index*			
1	How old are you today (yrs)?	<18 years	score 0
		18–28 years	score 8
		29–40 years	score 5
		41–48 years	score 2
		≥49 years	score 0
2	How many men have you had sex with in the last 6 months?	>10 male partners	score 7
		6–10 male partners	score 4
		0–5 male partners	score 0
3	In the last 6 months, how many times did you have receptive anal sex (you were the bottom) with a man?	1 or more times	score 10
		0 times	score 0
4	How many of your male sex partners were HIV positive?	>1 positive partner	score 8
		1 positive partner	score 4
		<1 positive partner	score 0
5	In the last 6 months, how many times did you have insertive anal sex (you were the top) with a man who was HIV positive?	5 or more times	score 6
		0 times	score 0
6	In the last 6 months, have you used methamphetamines such as crystal or speed?	Yes	score 5
		No	score 0
7	In the last 6 months,	Yes	score 3

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4911732/

https://ceitraining.org/documents/prep/HIRI-MSM%20Risk%20Index.pdf

An Example – Both Patients are Level 2 Risk

- Juan is a 62-year-old HIV patient who recently had a heart attack. He has recovered and is about to be discharged. His viral load is undetectable. He has been assigned *risk level 3* due to his recent heart attack. At your clinic, that means he will be invited to participate in your nurse care manager program. You note that before hospitalization Juan was not on a statin medication although he had diabetes and an LDL cholesterol of 140.

- Sam is a 62-year-old HIV patient who recently had a heart attack. He has recovered and is about to be discharged. His viral load is undetectable. He has been assigned *risk level 3* due to his recent heart attack. At your clinic, that means he will be invited to participate in your nurse care manager program. You note that before hospitalization Juan was not on a statin medication although he had diabetes and an LDL cholesterol of 140.

Should our care be the same?

Should their care be the same?

Escalation and de-escalation of risk tailored to the individual patient needs, risks, and barriers

- What other social factors are known?
- What else is known about care givers? Home? Health behaviors?

Summary

- Data stratification and analysis allow us to organize data and information to better understand processes in our systems as well as individual and population needs, risks, and barriers for the **purposes of equitably improving health outcomes, experiences of care, and value.**

- In implementing data stratification, it can be helpful to start with an action plan that includes the purpose, stratification criteria, detailed action steps to collect and analyze data, and steps to take after the initial analysis.

- Common tools to implementing data stratification include spreadsheets (Excel) or software as well as graphical tools like histograms and time-series charts.


QUESTIONS &
REFLECTIONS

THANK YOU

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Learn More

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