

BASIC Tools on IPEC: Dashboards to support infection control and antimicrobial stewardship

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Objectives

- To understand the functions of current dashboards for infection control and antimicrobial stewardship
- To understand the importance of validity and reliability when conveying aggregated statistics
- To understand the difficulties of supporting novel tasks

Here is my talk, and every dashboard, report,
and manuscript that you will ever see



What this talk is not

- A discussion of heuristics for visual design
- Data:ink ratio
- Images that are ~20% redundant are associated with human interest
- Ability to process different types of information
- The role of memory in visual processing
- The problem of numeracy even in trained individuals

Stephen Few, Information Dashboard Design

Edward Tufte, The Visual Display of Quantitative Information

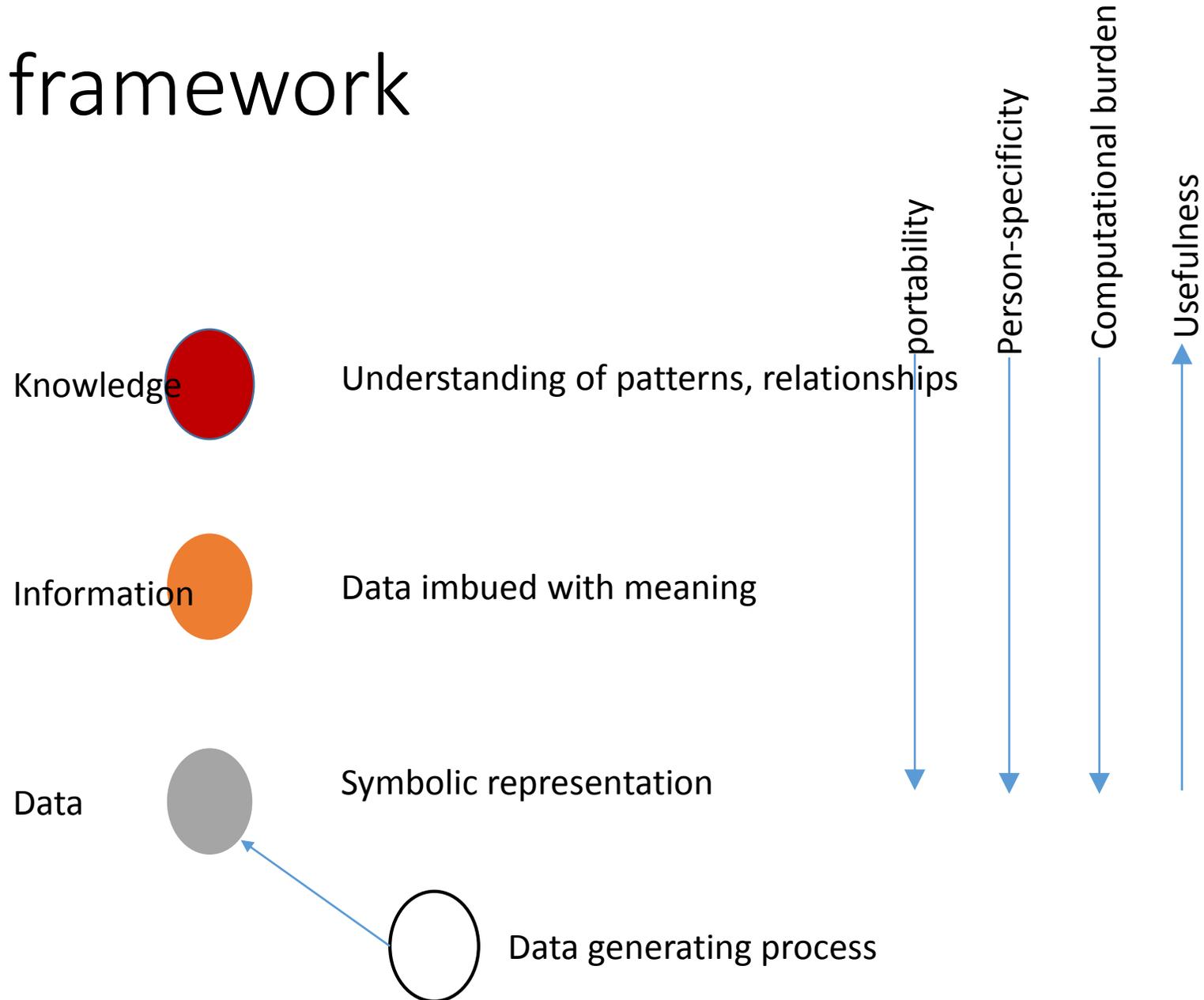
EO Wilson, Consilience

User illusion, Tor Norretranders

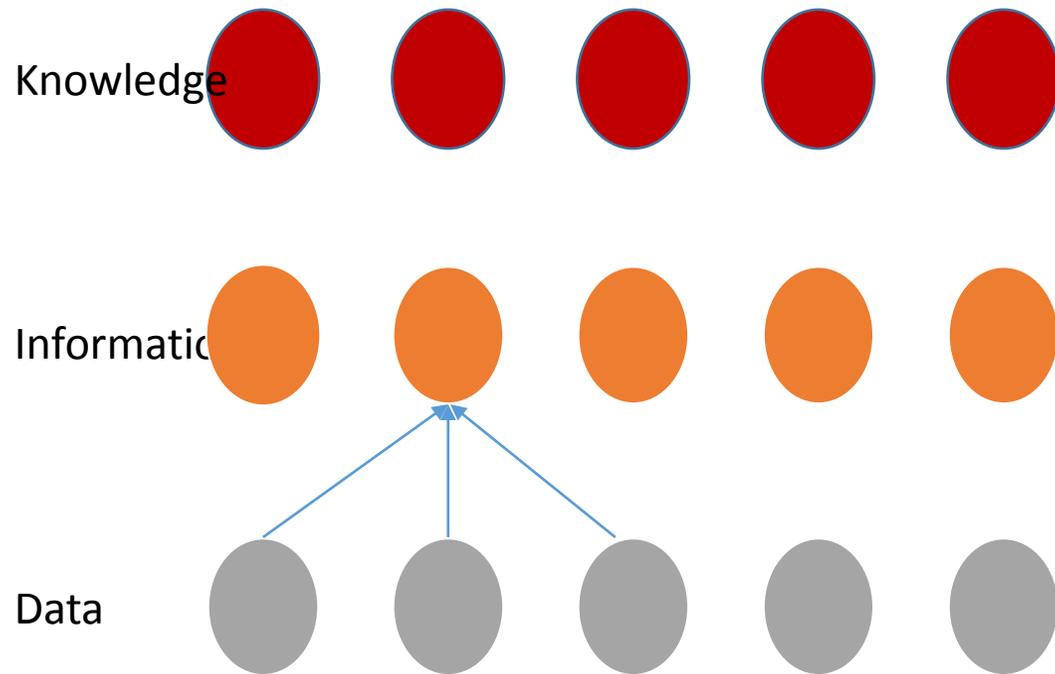
Thinking Fast and Slow, Daniel Kahneman

[10.1002/jhm.2680](https://doi.org/10.1002/jhm.2680), Govinda, Chopra, Iwashyna

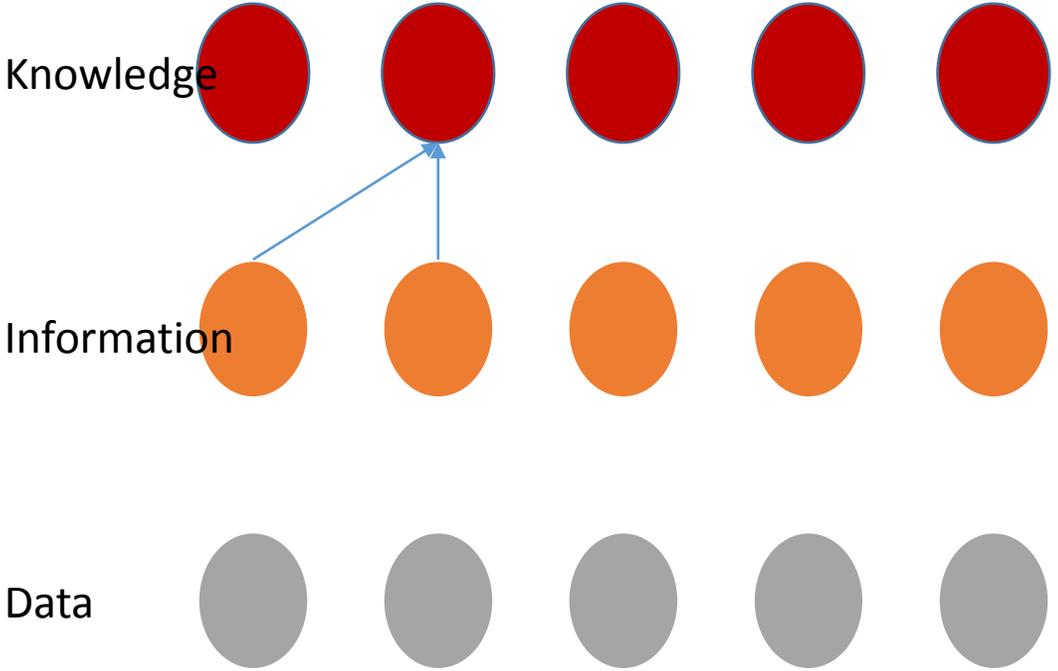
DIK -W framework



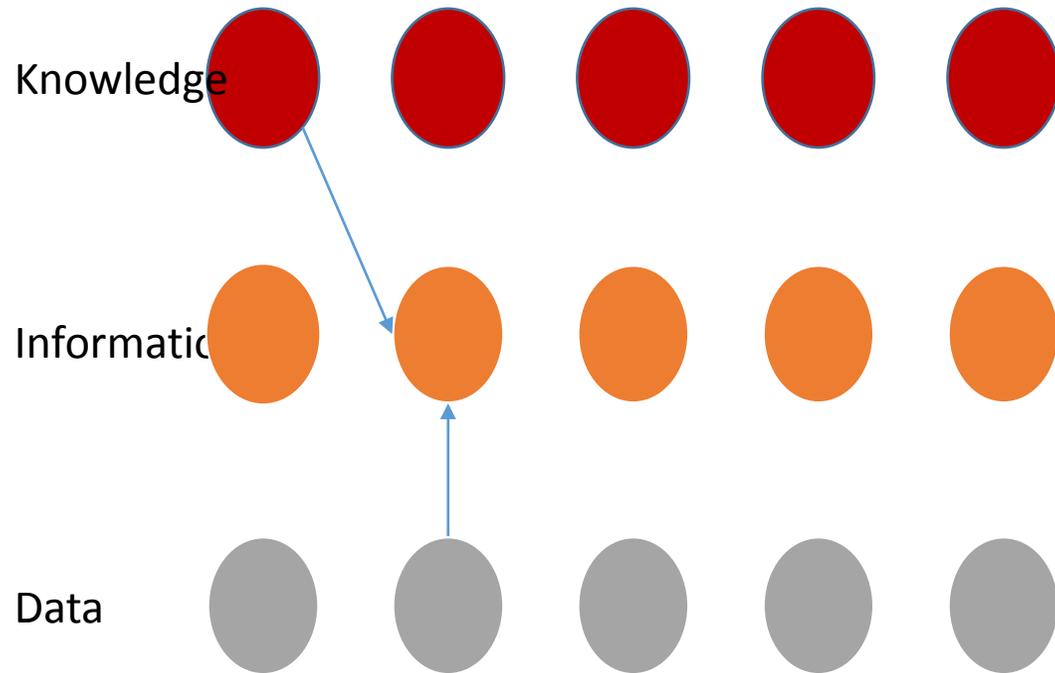
Information is “data imbued with meaning*”:
Analysis of integrated data to find meaning



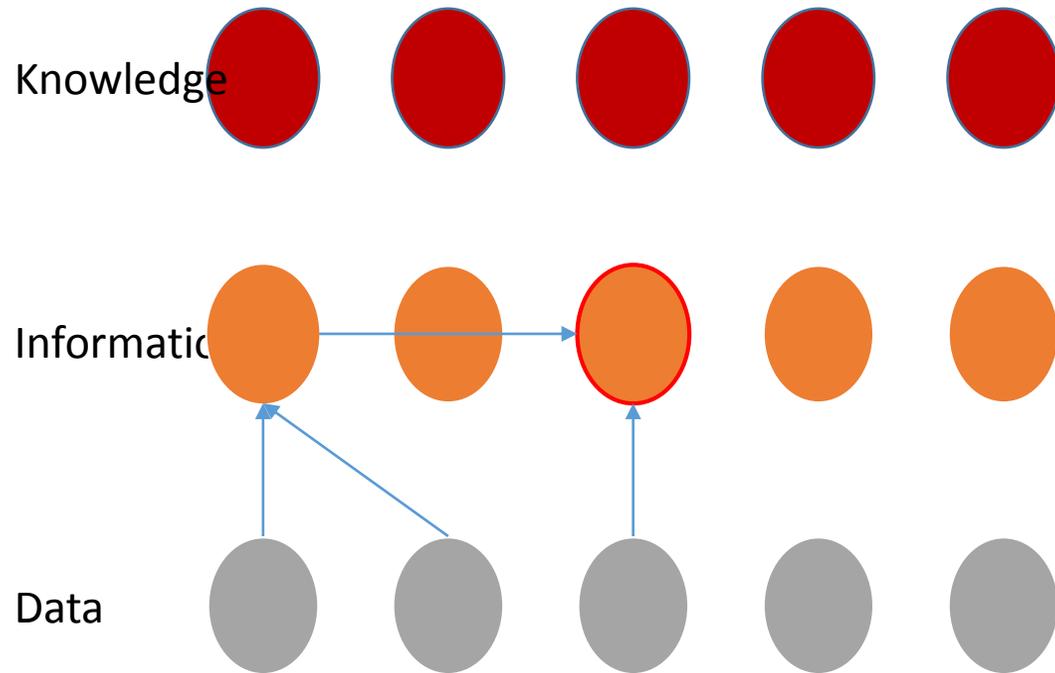
To understand, we integrate information



To interpret a data stream, we examine data within an interpretive framework

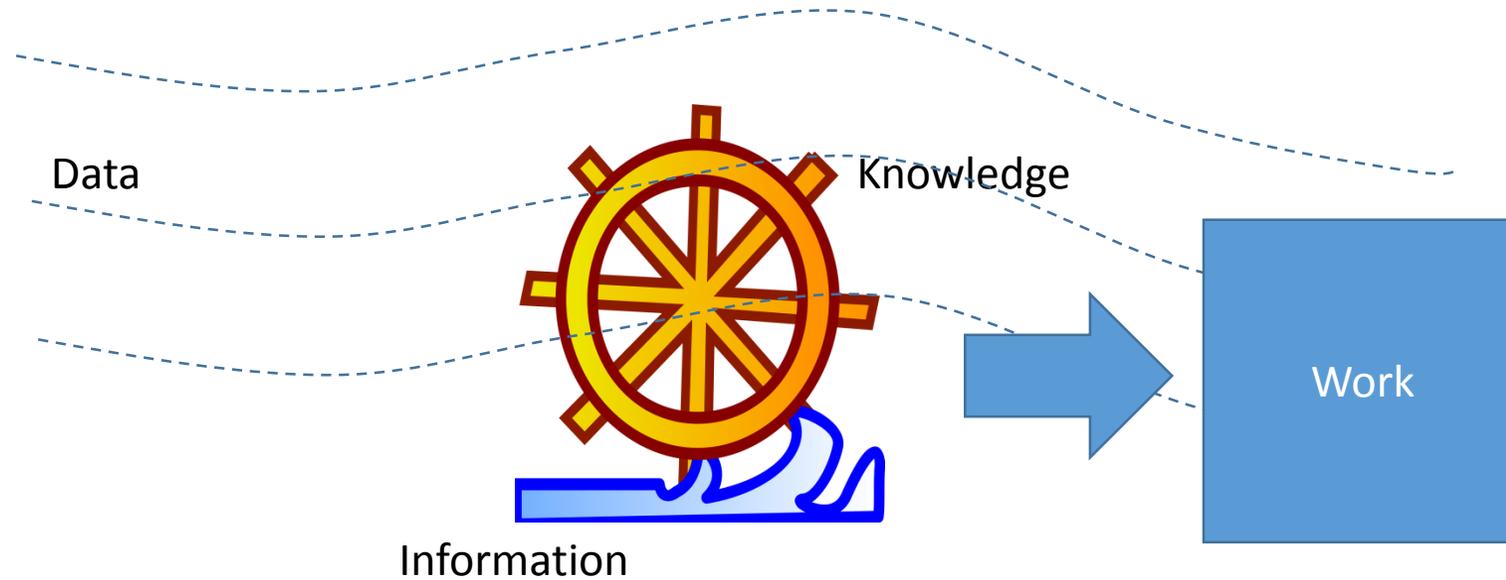


To contextualize or confirm information from a different source, we gather other data sources

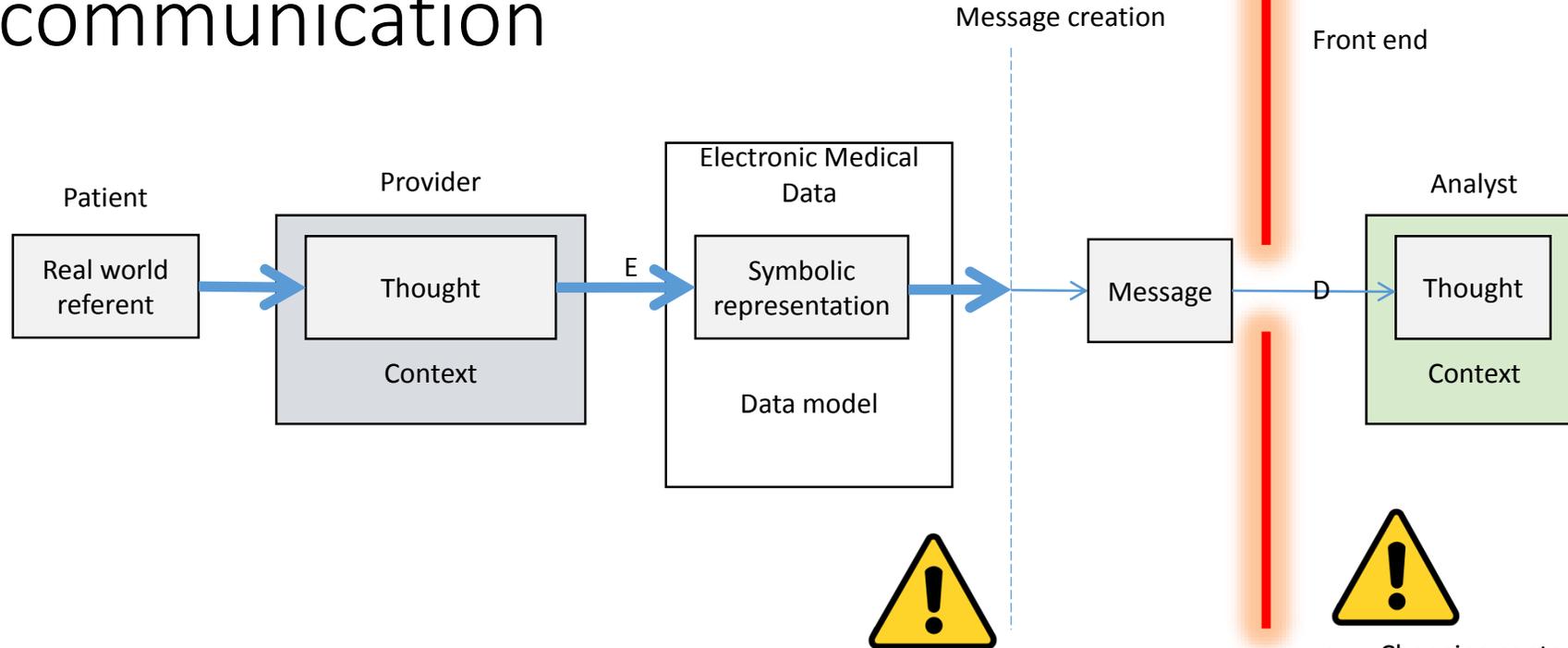


Data-Information-Knowledge

“Knowledge is heavy” — Cesar Hidalgo



Shared understanding: Semiotics and communication



E: Encode information using own context
D: decode information using own context

One-size fits all approach
results in information loss

- Changing context results in misinterpretation
- Receiver never knows what information is lost
- * Must accept open world assumption

4 levels of visualization tasks

1. Disseminative

- Share a fact or insight; $O(1)$

2. Observational

- What is happening, when or where; $O(n)$

3. Analytical

- Correlation, association, causality; $O(n^k)$
 - n data objects and k possible relationships

4. Model-development

- Exploration of models; $O(k^n) \rightarrow O(n!)$
 - n parameters and k values

“Measure what Matters” –John Doerr

- “Any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes.” –Goodhart’s law
- In the following, you will see part of our journey to date...

The What

BASIC Tools, launched November 2017, contains:

- Patient Search
- Potential Precaution Candidates
- Culture list

The Reports page

The screenshot shows the IPEC (Inpatient Evaluation Center) website. The header includes the IPEC logo, the text "United States Department of Veterans Affairs Inpatient Evaluation Center (IPEC)", and a search bar. A blue navigation bar contains links for "Infection Control", "About", "Reports", "Permissions", "Future Enhancements", and "Documentation". A red circle highlights the "Reports" link. Below the navigation bar, a status message reads "Daily data loads occurred successfully". Two paragraphs of text are circled in red: the first is a red notice about a "Culture List report" issue, and the second is a blue disclaimer about the use of data for quality improvement. Below this is a "REPORTS" section header. Under "Tools", there are links for "User Guide", "BASIC National Education", "Patient Search", and "NHSN HAI / POA Worksheet Generator". The "Pre-configured Reports" section is circled in red and lists: "Potential Precaution Candidates (Patients with history of pathogens of interest)" with a "Save to Excel" link circled in red; "All Positive Cultures; All Patients" with a "Save to Excel *" link; "Positive Blood Cultures; All Patients" with a "Save to Excel *" link; and "Positive Urine Cultures; All Patients".

IPEC
VA Inpatient
Evaluation Center

United States Department of Veterans Affairs
Inpatient Evaluation Center (IPEC)

Search this site

Infection Control About **Reports** Permissions Future Enhancements Documentation

Daily data loads occurred successfully

There is still a known issue in the Culture List report where results are getting an incorrect Setting value (Outpatient vs. Before Day 3 of Admission vs. On or After Day 3 of Admission). This could cause missed results if user is not including ALL Setting options in a view. The development team is currently working on a fix for this. Thank you for your patience.

These tools are meant for quality improvement purposes and are not to be used for direct patient care. Vista/CPRS is the medical record and either it or other approved medical devices should be used to gather definitive information for patient care. Please note these data are populated each night using Corporate Data Warehouse data and that there will be an obligatory one day lag under the best of circumstances. By accessing the links below, you acknowledge that you understand this.

REPORTS

Tools

- User Guide
- BASIC National Education
- Patient Search
- NHSN HAI / POA Worksheet Generator

Pre-configured Reports

- Potential Precaution Candidates (Patients with history of pathogens of interest)
 - Save to Excel
- All Positive Cultures; All Patients
 - Save to Excel *
- Positive Blood Cultures; All Patients
 - Save to Excel *
- Positive Urine Cultures; All Patients

Documentation

- User Guide
- BASIC National Education video (from kickoff)
- NHSN HAI/ POA Worksheet Generator

Permissions

- SharePoint[®] —managed by IPEC
- LSV
 - Requires documentation and approval by your supervisor and your ISO
 - Provides you access to stations within your scope of practice

<http://ipec.vssc.med.va.gov/IC/Pages/Permissions.aspx>

Patient Search

Patient Search - Allows the user to search for a patient to see if this patient has an MDRO history from any VA facility.

Station: (660) Salt Lake City HCS (Salt Lake City UT) Criteria:

Hide Names: Don't hide

1 of 1 100% Find | Next

IPEC VA Inpatient Evaluation Center **Patient Search** [User Guide](#)
[We welcome your feedback](#)
[Ask a question or report a problem](#)

Station: ()

Patient Name	Last4 of SSN	Date of Birth	Gender	Culture Taken Last 7 days	Pathogen	Inpatient	Report Issue
				Not Taken	No	No	

We care about data quality: Report issues



Station: [redacted] Criteria [redacted] View Report

Hide Names [redacted]

Station: [redacted]

Success

Station: [redacted]

Patient Name: [redacted]

BASIC Tools Error Reporting

Report an Issue on: **InpatientList Report** by: **VHA19VHASLJonesM1**

For Record with Patient Name: [redacted]

Date of Birth: [redacted]

Issue Option: **No comment**
Reviewed: data missing
Reviewed: data wrong
Reviewed: no issue

Description of Issue: [redacted]

Submit

12:46 PM 8/15/2018

Potential Precaution Candidate List

Gives the user a line listing of currently hospitalized patients and relevant microbiology information. The list is

customi

current

(MDRO)

see addi

The screenshot displays the 'InpatientList Report' interface. At the top, there are several filter sections: 'Station (if > 30 stations chosen, selection defaults to ALL):' with a dropdown menu; 'Facility (if > 30 facilities chosen, selection defaults to ALL):' with a dropdown menu set to 'All Facilities'; 'Cultured past 7 days:' with a dropdown menu set to 'Taken,Not taken'; 'Culture findings:' with a dropdown menu set to 'Positive,Negative'; 'Pathogen in Current Admit:' with a dropdown menu set to 'Yes,No'; 'Any History of Pathogen:' with a dropdown menu set to 'Yes'; 'Pathogen selected (Including current and past Pathogen):' with a dropdown menu set to 'CRE_cdc2015,VA_CPCRE_confirmed,V...'; 'Hide Names:' with a dropdown menu set to 'Hide'; 'Order By:' with a dropdown menu set to 'Admit to VA Date Descending'; 'List By:' with a dropdown menu set to 'List By Page'; and 'Page' with a text input set to '1'. A 'Detail Info:' dropdown menu is set to 'Collapsed'. A 'View Report' button is located in the top right corner.

Below the filters is a navigation bar with a 'Jump to Culture List' link, a '1 of 1' indicator, a refresh icon, a '100%' zoom level, a save icon, a print icon, and a search box with 'Find | Next' text.

The main content area features the 'IPEC VA Inpatient Evaluation Center' logo on the left, the 'InpatientList Report' title in the center, and a 'User Guide' link on the right. Below the title, there are links for 'We welcome your feedback' and 'Ask a question or report a problem'. A yellow bar is present above the table.

Below the yellow bar, the text 'CDW ETL batch load time of 8/15/2018 2:44:05 AM, BASICTools load time of 08/15/2018 09:31:16 CDT' is displayed.

The table below contains patient data:

Patient Name	Last 4	Admit to VA Date	Ward Type / Ward, Room	Cultured Past 7 Days	Culture Finding	Setting	Report Issue
Withheld	Withheld	2018	Withheld	Taken	Positive	Within 3 Days of Admission	✘
Current Pathogen: CRE_cdc2015, CRE_nos, MDRE, VA_CPCRE_suspected,				Past Pathogen: CRE_cdc2015, CRE_nos, MDRE, VA_CPCRE_suspected,			
Withheld	Withheld	2018	Withheld	Taken	Positive	Within 3 Days of Admission	✘

Culture Report

Giv
day
pat
MC
pos

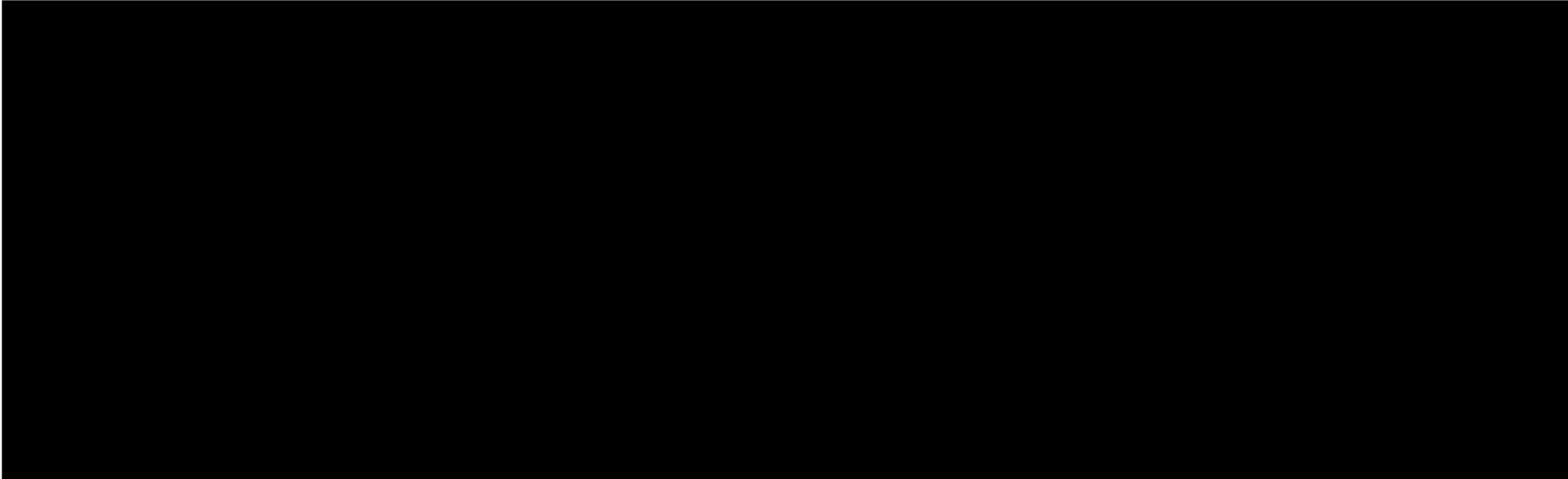
Withheld	Withheld	Withheld	2018	BLOOD	Outpatient	Positive	No		
Collection Info:			Outpatient		Admitted:				
Diagnostic Info:			Requesting: Withheld		Primary: Withheld		Fever, unspecified SEPSIS		
Result Info:			Staphylococcus aureus,						
Specimen Rec'd	Requesting Ward	Topography	Collection Sample	Report Completed	Specimen Comments				
2018	ED	BLOOD	BLOOD (C&S)						
Report Status:			Bact [redacted] 2018 F		AFB:				
Stain:			Smear Prep:						
Prelim:									
Remarks:			Critical results called to and verbally confirmed by: [redacted] BY HB TESTING PERFORMED AT [redacted]						
Organism	Quantity	Organism First Report Date	Organism Last Update Date	Pub Health Flag	Organism Comments				
STAPHYLOCOCCUS AUREUS (Isolate 1)		2018	2018		STAPHYLOCOCCUS AUREUS DETECTED BY NUCLEIC ACID ASSAY METHACILLIN RESISTANCE GENE (MECA) NOT DETECTED INFECTIOUS DISEASE CONSULT RECOMMENDED Penicillin Interpretation: NOT REPORTED Gentamicin: Susceptible- For staphylococci that test susceptible, gentamicin is used only in combination with other organism expresses the MecA protein that confers resistance to oxacillin and most other beta-lactam antibiotics. The absence of PBP2a indicates MecA-mediated resistance was not detected, but does not rule out the presence of oxacillin resistance by alternative mechanisms.				
Antimicrobial	Antibiotic Sensitivity Value		Interpretation		Antibiotic Comments				
Daptomycin	S		S						
Gentamicin	S		S						

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Exploit or explore

Configurable Reports

- [Inpatient List](#) Line list of all currently hospitalized patients with current or recent pathogens of interest
- [Culture List](#) Line list of inpatient and outpatient cultures by specimen type, causative organism, and setting



Antimicrobial stewardship

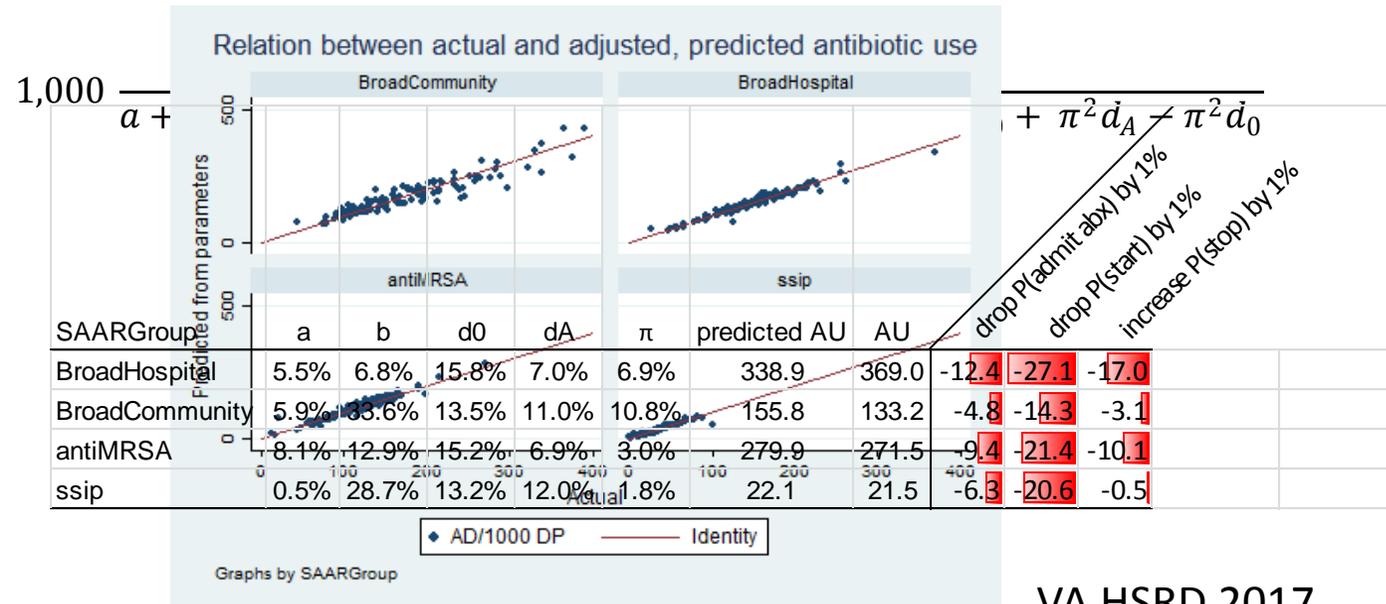
- VA was recognized by the White House for its work reporting antimicrobial use data for >40 VAMCs in May 2015
- VA recognized as an exemplar for reporting antimicrobial use data for > 90 VAMCs to CDC for CDC's AMR challenge at the United Nations General Assembly launched in September 2018 and for its work on stewardship interventions in in- and outpatient settings

<https://obamawhitehouse.archives.gov/blog/2015/06/03/white-house-forum-antibiotic-stewardship-convenes-government-and-private-sector-lead>

<https://www.cdc.gov/drugresistance/intl-activities/amr-challenge.html>

You don't always know what to do when you get what you think you wanted...

- Your antibiotic use is 589 AD/1000 DP
 - Is this good or bad?
 - Which part of it is good or bad?
 - If it's bad, how do I know what to fix?



Tying to aggregate measures to decision points: Choice, Change, and Completion

- **Choice:** Initial empiric selection of antibiotic. This time period covers the first 3 days of antibiotic treatment.
- **Change:** Also called streamlining or de-escalation. This time period covers day 4 and 5 of antibiotic treatment.*
- **Completion:** is the decision of when to end antibiotic treatment. This time period spans day 6 and 7.*

*If the patient has been discharged then the discharge antibiotics are considered.

Choice, Change, and Completion

Choice

Start an anti

Completion

n antibiotic

The relationship between Choice, Change, and Completion and Antibiotic Use can be thought of as if it were an assembly line



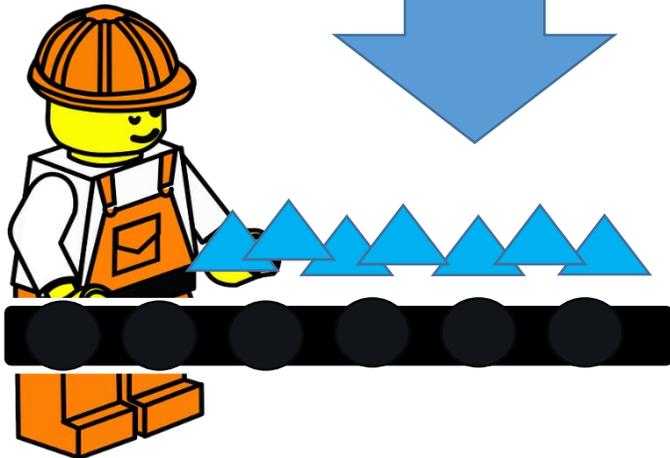
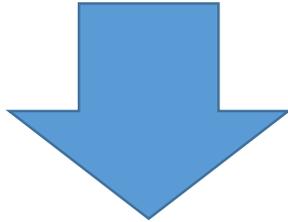
The sum of triangles represent antibiotic use

Choice, Change, and Completion

Choice

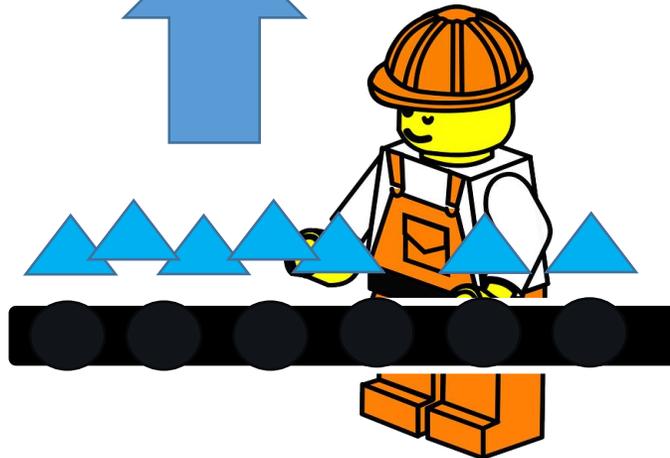
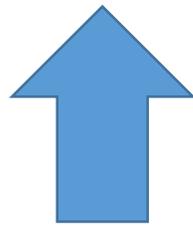
Start an antibiotic

Start more antibiotics



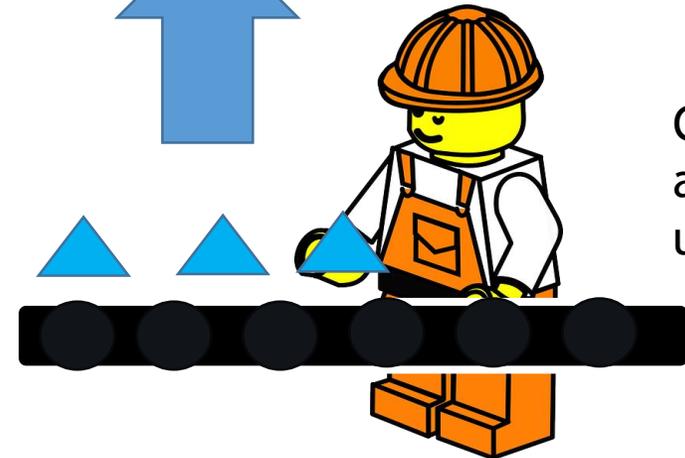
Change

Change an antibiotic



Completion

Stop an antibiotic

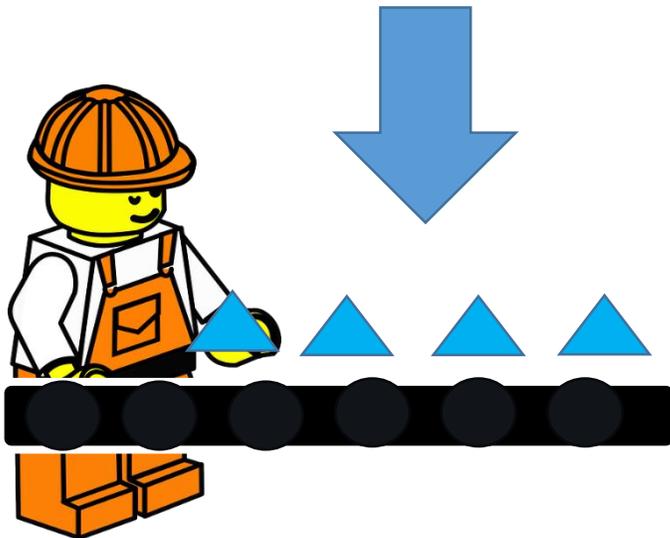


Get more
antibiotic
use

Choice, Change, and Completion

Choice

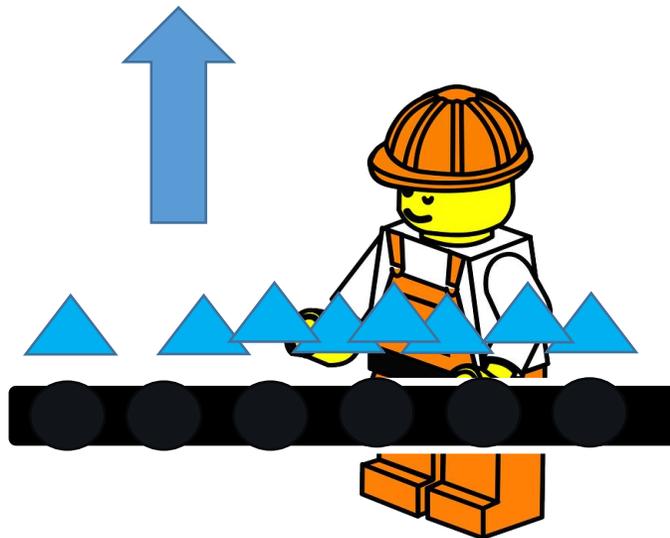
Start an antibiotic



Change

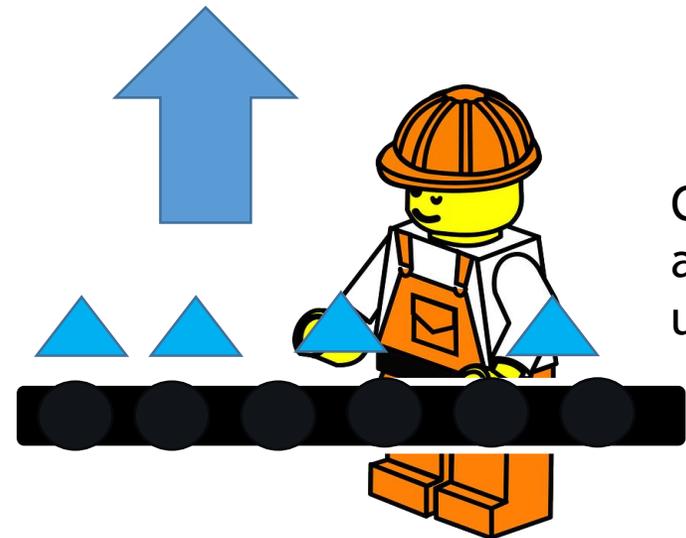
Change an antibiotic

Change fewer antibiotics



Completion

Stop an antibiotic

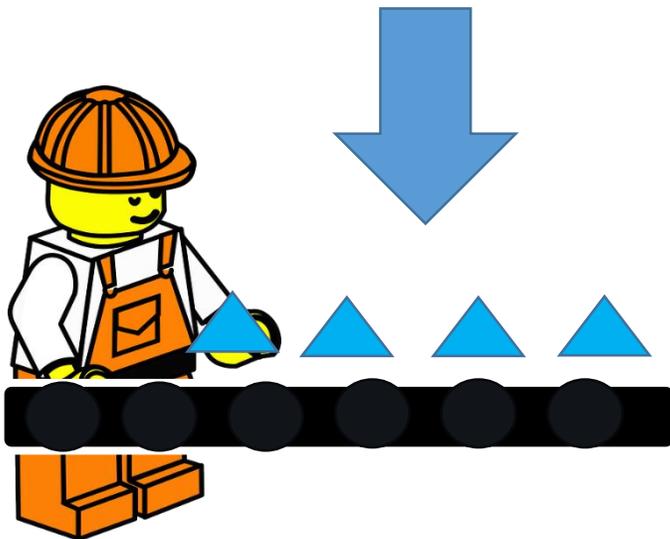


Get more antibiotic use

Choice, Change, and Completion

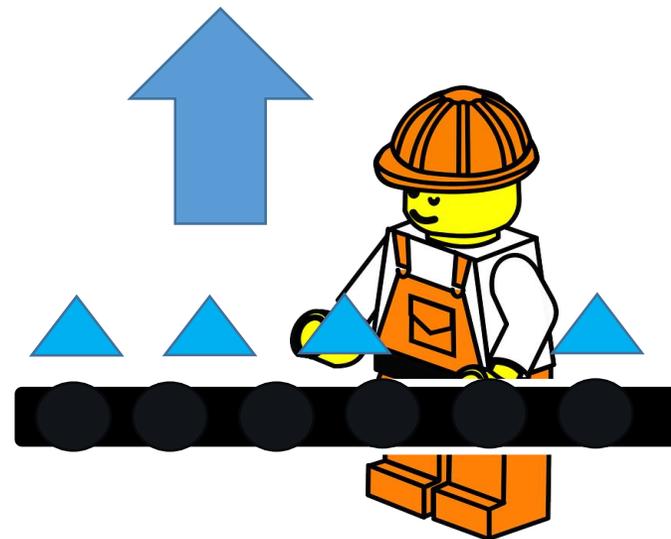
Choice

Start an antibiotic



Change

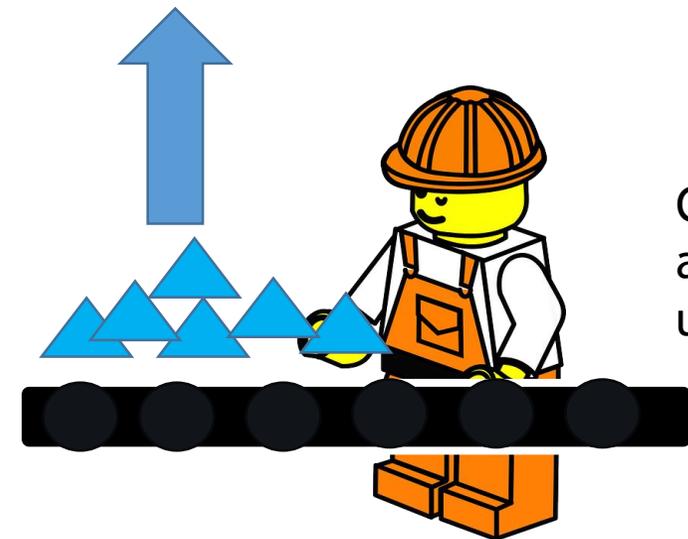
Change an antibiotic



Completion

Stop an antibiotic

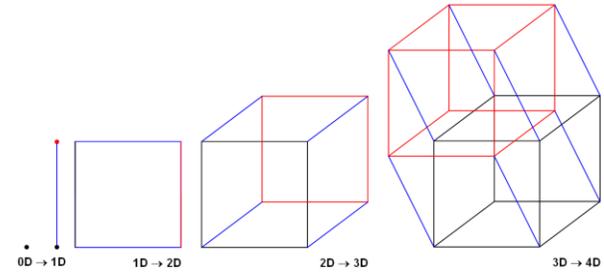
Stop fewer antibiotics



Get more
antibiotic
use

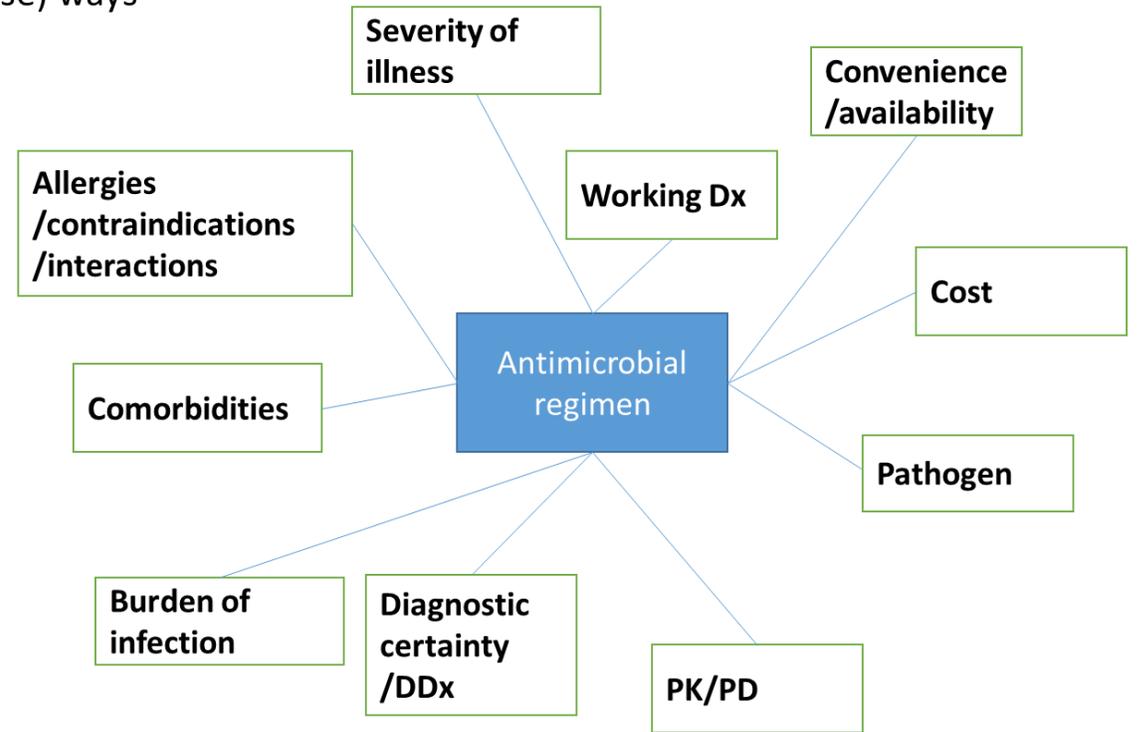
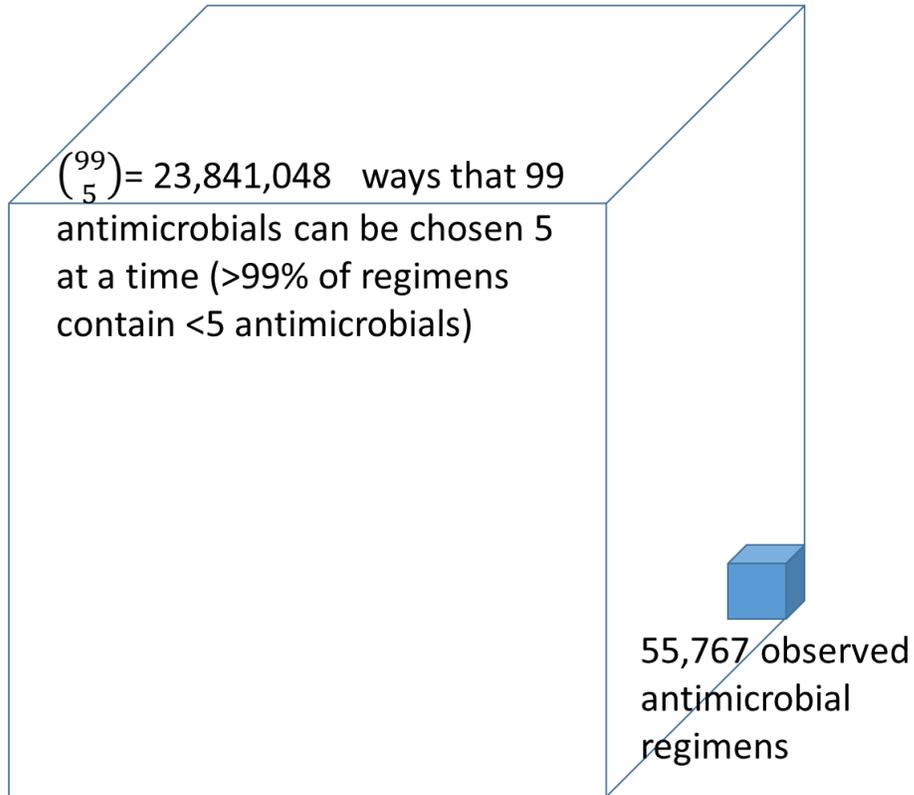
Online Analytic Processing (OLAP) Cubes

- Can allow rapid exploration with the security model integrated
- “Canned” views ok for a beginner but routine use probably needs analytic skills
- More up front work, less work configuring
- We use cubes not just for antimicrobial use in different facilities, different wards, but also for different diagnoses, and different stages in the diagnostic process

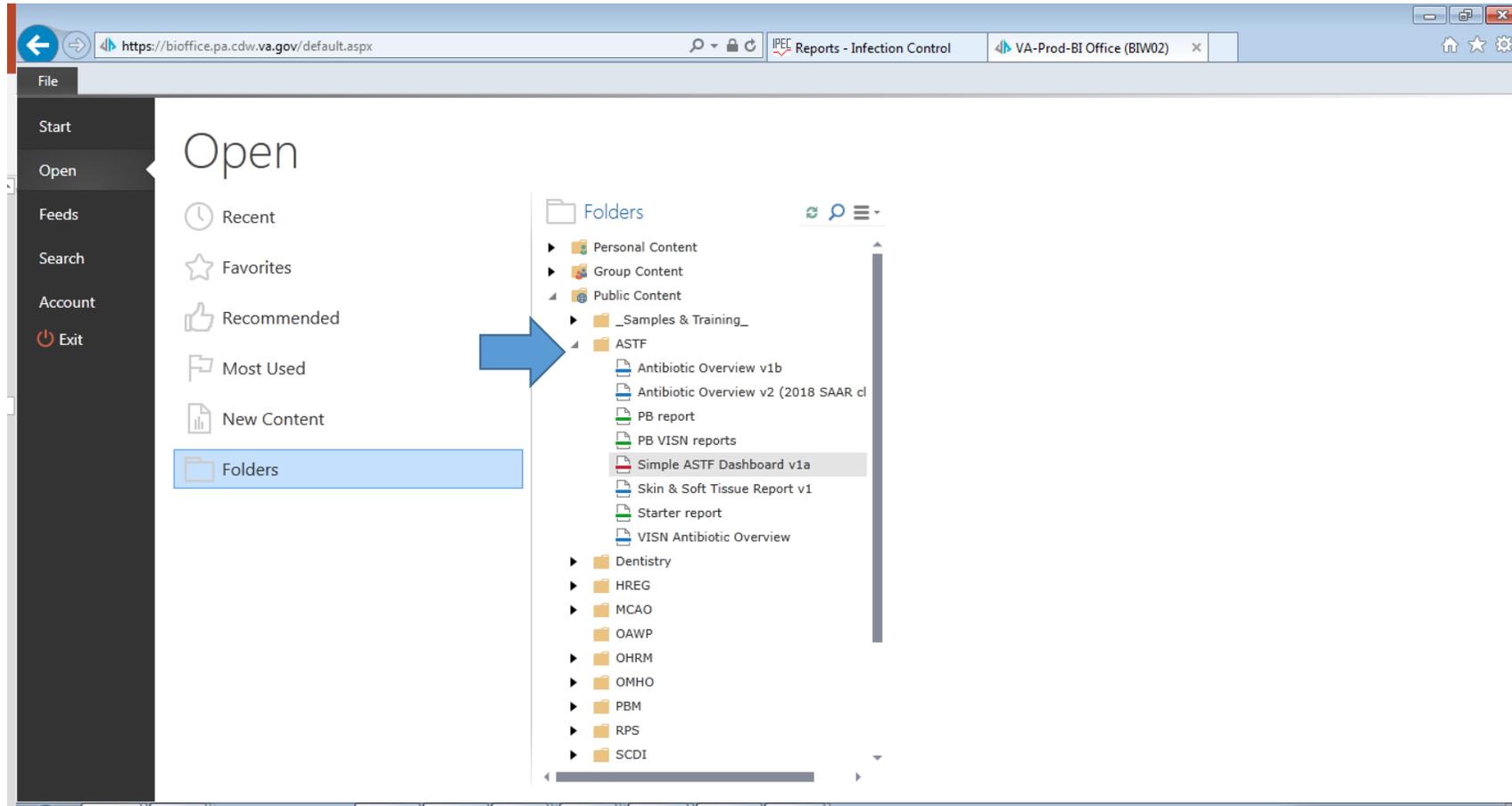


A word about complexity

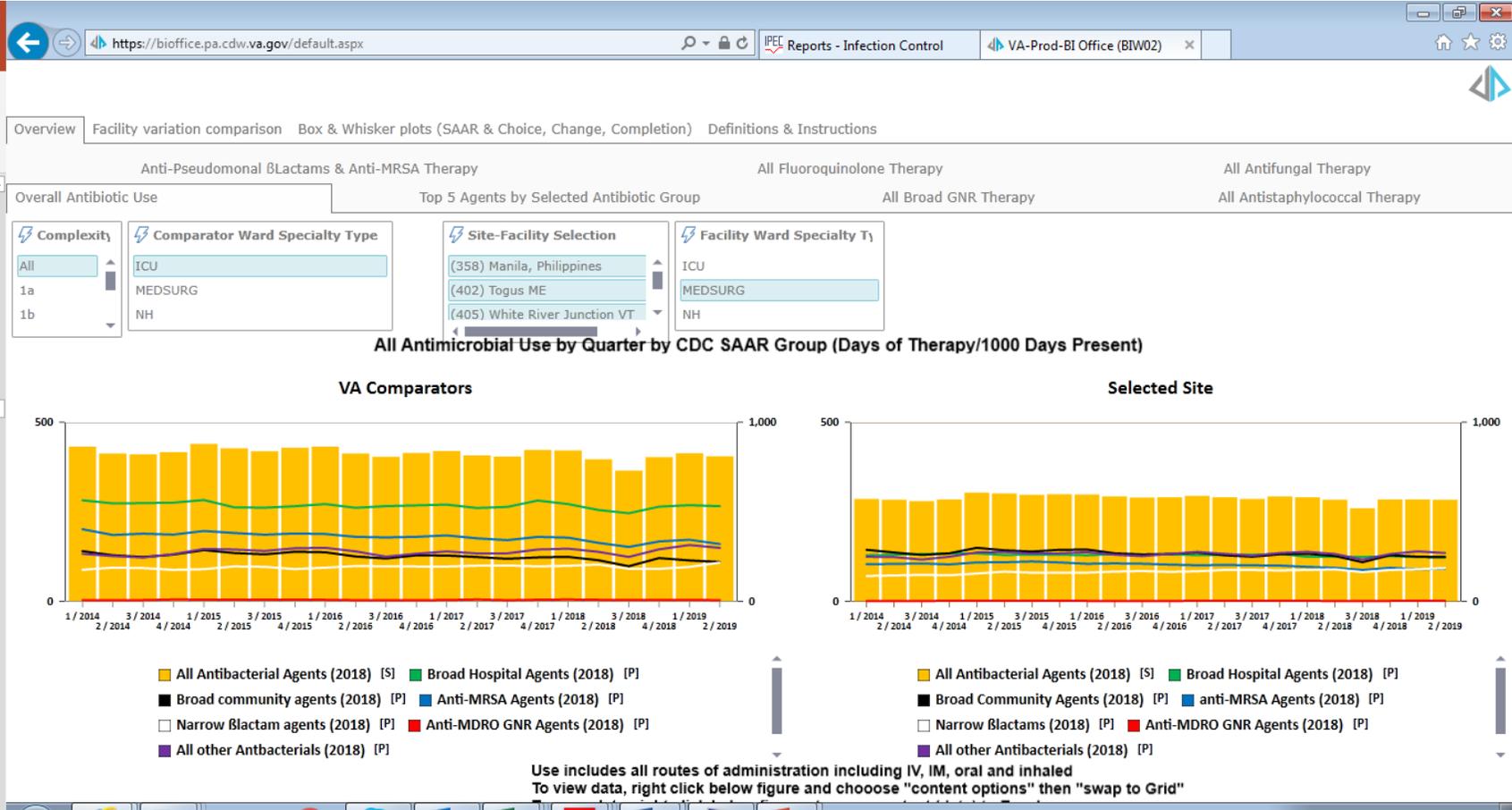
$99! = 9.3 \times 10^{155}$ ($\sim 10^{70} \times$ more than particles in the known universe) ways that 99 antimicrobials can be combined



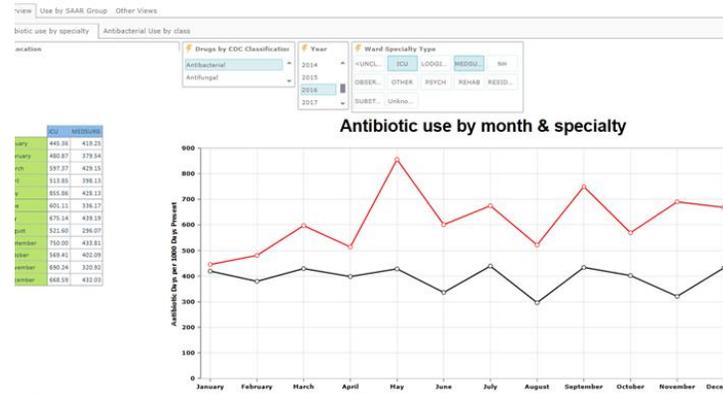
Accessing Pyramid Analytics



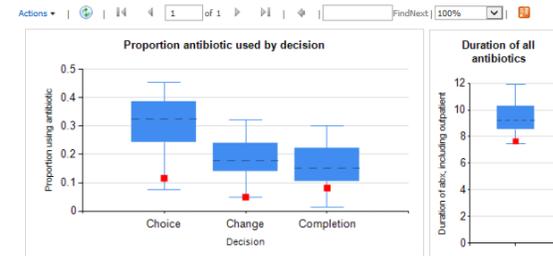
Dashboards created by VA GLA



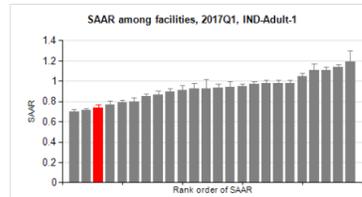
Other displays



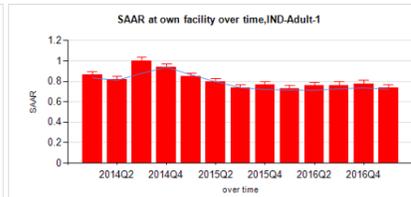
Report Viewer - CCC



whiskers: 5th and 95th percentile
 box IQR
 dotted line: median
 Red dot: your facility



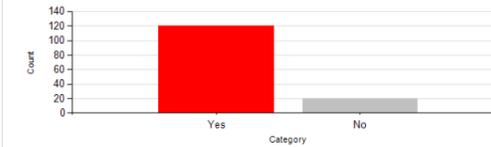
bars represent SAAR, red bar is your facility
 error bars represent 95% confidence intervals



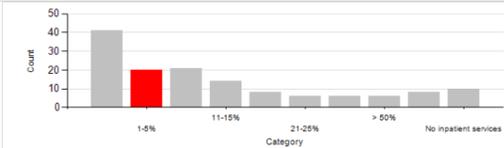
bars represent SAAR
 error bars represent 95% confidence intervals
 line represents moving average

Question

09 9. Are Clinical Pharmacists/Clinical Pharmacy Specialists assigned to any acute care teams or wards at your hospital/facility?



11 11. Please estimate the proportion of inpatient attending service on general medical ward teams covered by the ID staff.

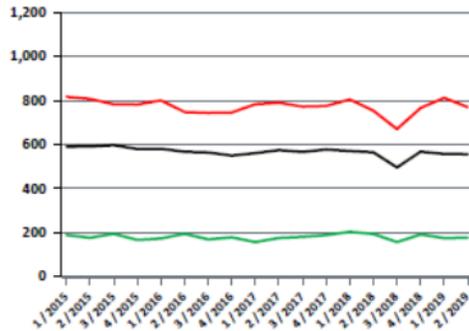


13 13b. Is there a Clinical Pharmacist/Clinical Pharmacy Specialist dedicated to staff the ED?

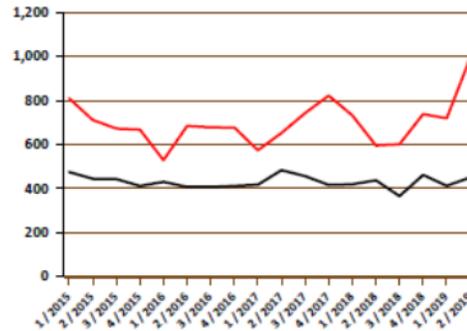
Subscriptions for publications

Comparative and site data are for [redacted]
(Selected Year is used only in variation reports on pages 5-9)

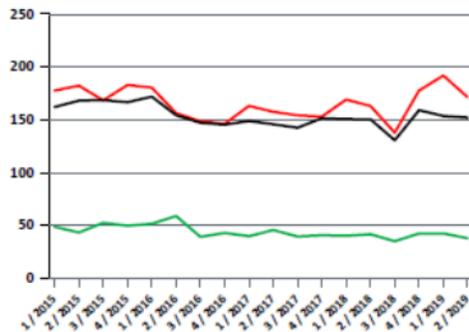
VA Comparators: Quarterly Antibacterial Use



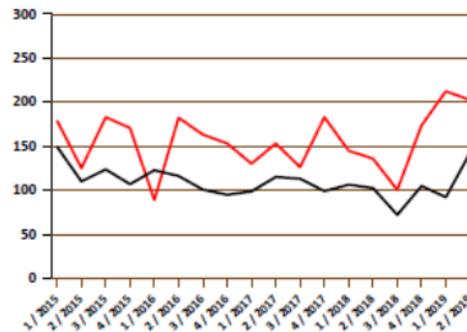
Selected Site: Quarterly Antibacterial Use



VA Comparators: High Risk C. difficile antibiotic use



Selected Site: High Risk C. difficile antibiotic use

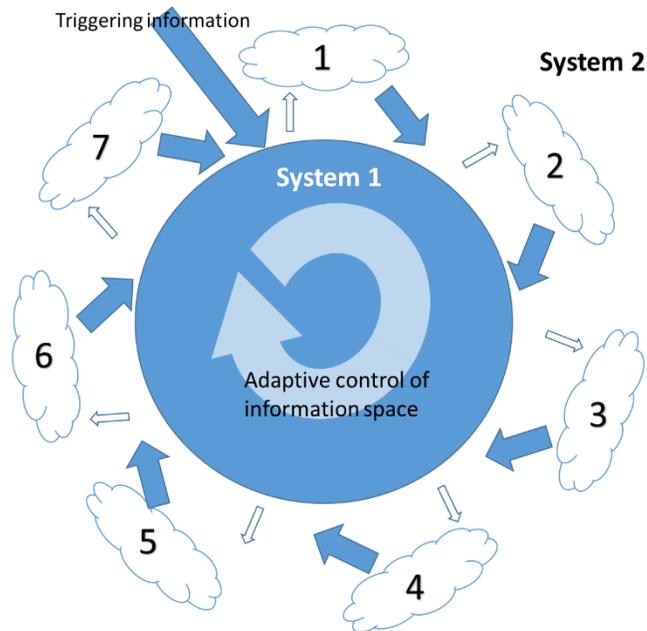


- Helpful for data that do not change rapidly and might otherwise be forgotten

In the Works

- MDRO Tracking
- Healthcare-associated infections
- Biosurveillance
- Antimicrobial use (use of certain agents can be a bellwether for resistance)

Building tools for stewardship interactions



	Construct	Explanation
1		Contexts, situations, and electronic triggers bring a potential problem to one's notice. Often these were social or embedded automatic work processes.
2		What is the nature or "gist" of the problem? A common, systematic process was used to clarify the nature of the problem. The patient's acuity and the team's impression were the most vivid source of information. Chart review was performed when the details of the case did not fit a recognized pattern.
3		What information do I need to act? Information on diagnosis, urgency, and team motivation and expertise were integrated to identify what to do. If the situation matched a protocol, they would use it directly, suggesting a mental shortcut or System 1 thinking in Dual Process Theory ² parlance.
4		Some have learned to avoid talking about resistance as a motivation or to use indirect narratives to negotiate the balance between resistance and treatment. Actions were taken to set up future "triggers" as part of the negotiation process as well as action in the future.
5		What more needs to be done? How has the patient responded? Many stewards noted that it is easier to make changes after 2-3 days of therapy. One steward expressed, "if something happens [when recommending antibiotics or no antibiotics in the first few days] they're going to blame you from here to eternity."
6	Information gathering	Do I need more information to evaluate?
7		

CRE Tracking Study

Courtesy of Christopher Pfeiffer, MD, MHS
Hospital Epidemiologist
VA Portland HCS
Oregon Health Sciences University

With funding from CDC and sponsorship from VA MDRO Program

Outline

MDRO tracker is an extension of the BASIC platform that identifies MDRO tests across VA and notifies subscribers of admission by email

In 2017, MDRO Tracker was piloted at 10 VA facilities:

- Timeliness and accuracy of the system were optimized
- 26% of CRE cases and 2% of MRSA cases were identified by BASIC prior to existing methods.
- 12% of CRE cases identified were based on results from a remote facility, making them difficult to systematically detect without BASIC Tools.

In 2018, 12 more medical centers have been added.

BASIC User Feedback Responses, stratified by Report and Organism

	Old %	New %
I didn't know this information and probably wouldn't have.	7.9%	21.3%
I didn't know this information at the time but would have.	15.9%	17.0%
I was aware of this information but it was still useful.	23.8%	44.7%
I was aware of this information. The tool was redundant.	52.3%	17.0%

Quotes from participating MDRO Coordinators and Infection Preventionists:

- “I don’t know what I would do without it now, actually, because it is fabulous. You know before, we would have to look up patients individually and print off all these reports...”
- “We had a patient come from another state and our MRSA swab was negative so the patient wasn’t placed in isolation, but when he came up on BASIC, he was positive for MRSA two months prior at another facility.”
- “It’s very, very useful; it’s very timely.”

The How: CDW-based reports

- Leverages existing data, software, hardware, data flow, security, policy infrastructure
- Allows integration of data across VistAs
- Allows more complex phenotypes
- Contains suppressed susceptibilities
- Refreshed once daily
- Can be standardized
- Nota bene: Does not cover mycobacteriology at this point

Takeaways

- Choose metrics that matter
- Try to find the optimum between creating a versatile tool that can be “exploited” (adapted) and a tool that is just right for one very particular job
- Have changing content to keep bringing people back (manipulation of dopamine?)
 - If too intermittent, allow people to subscribe
- Start with granular data to show validity and then build more abstract tools from there—you will have the ability to drill back down
- It’s never just about the dashboard
- You don’t really know what you want when you start
- Supporting analysis and model building is hard because the computational complexity explodes

Open questions

- Meta-metrics: metrics that can tell you how good a job your dashboards are doing
 - Use
 - Usability / computational cost?
 - Veterans impacted?
- Can we translate these into an optimizable objective function?

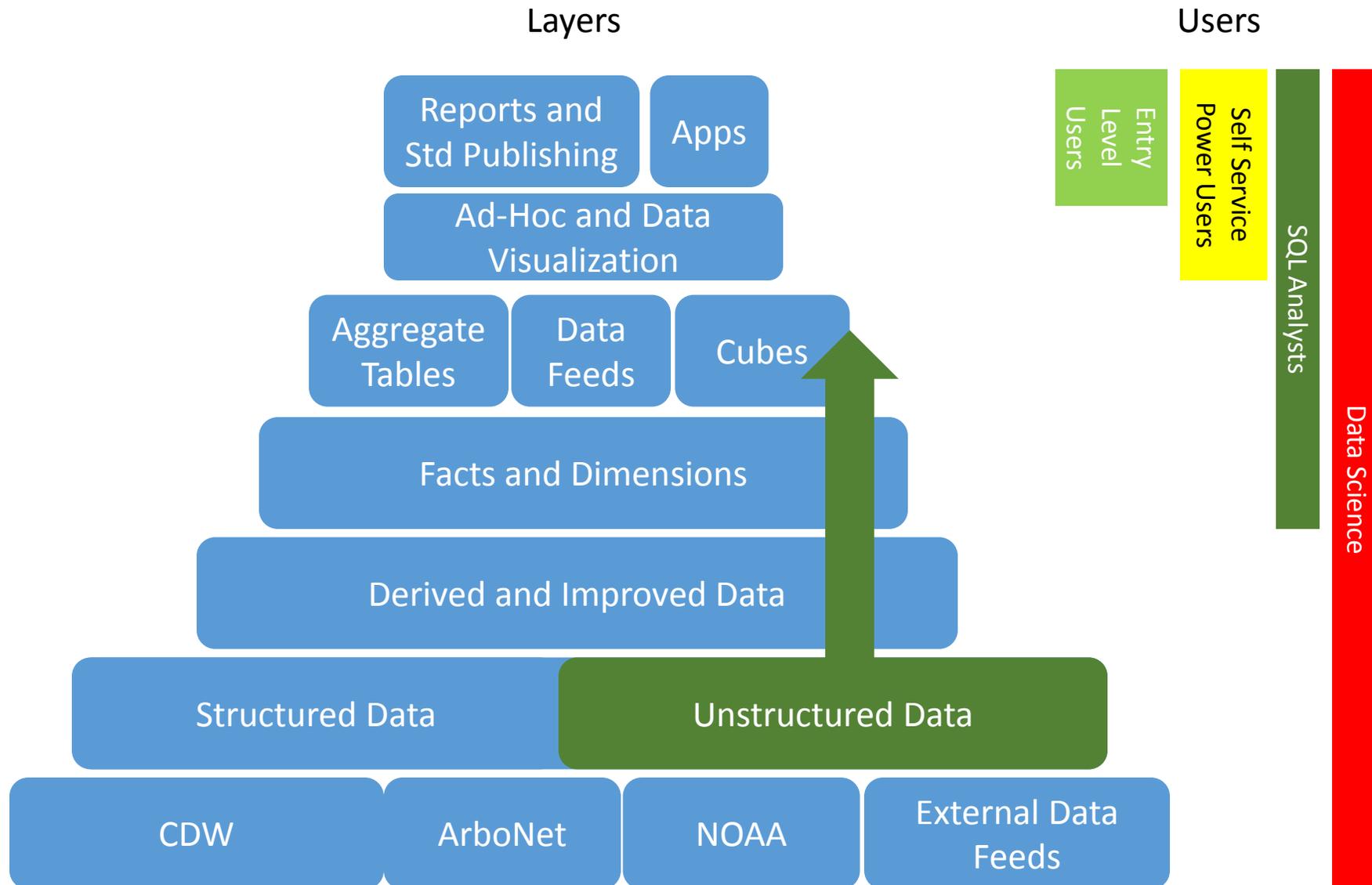
Acknowledgements

- VHA Clinical Systems Development and Evaluation
- VHA Inpatient Evaluation Center
- VHA National Infectious Diseases Service
- VA Office of Information and Technology
- VA Antimicrobial Stewardship Task Force
- VHA Pharmacy Benefits Management
- VHA HSR&D
- VA SLC HCS Research
- VA GLA HCS
- VHA HSRD COIN: IDEAS Center
- Veterans Informatics and Computing Infrastructure
- VA Office of Operations, Security and Preparedness
- VA Director for Biosurveillance
- Centers for Disease Control and Prevention
- Department of Homeland Security
- And many others

The How

- Integration Project Teams for Biosurveillance, Antimicrobial Stewardship, and Infection Control commissioned by Dr. Agarwal
- Sponsorship and support from Clinical Systems Development & Evaluation
- Guidance and direction from
 - National Infectious Diseases Service
 - Antimicrobial Stewardship Task Force
 - Pharmacy Benefits Management
 - Office of the Director of Biosurveillance
- Collaboration with Inpatient Evaluation Center
- Feedback and discussion with many of you

BASIC Analytics Platform



Imbuing data with meaning: strengthening the DHS-VA project by sharing the knowledge base

Case Definition for Positive Zika Tests

Code Definition:

Case Name	Display Name	Case Type	Case Desc.	Case Def. Domain	Case Def. Domain Category	Finding Tag	Code Source
Zika_Positive	Positive Zika Tests	Not Sure if needed	This group represents Positive Zika tests. It may not contain all newly added Zika labs.	Orders	Laboratories	ZIKA	LOINC
Code Values:		FAKE ZIKA LOINC,					

SQL Definition:

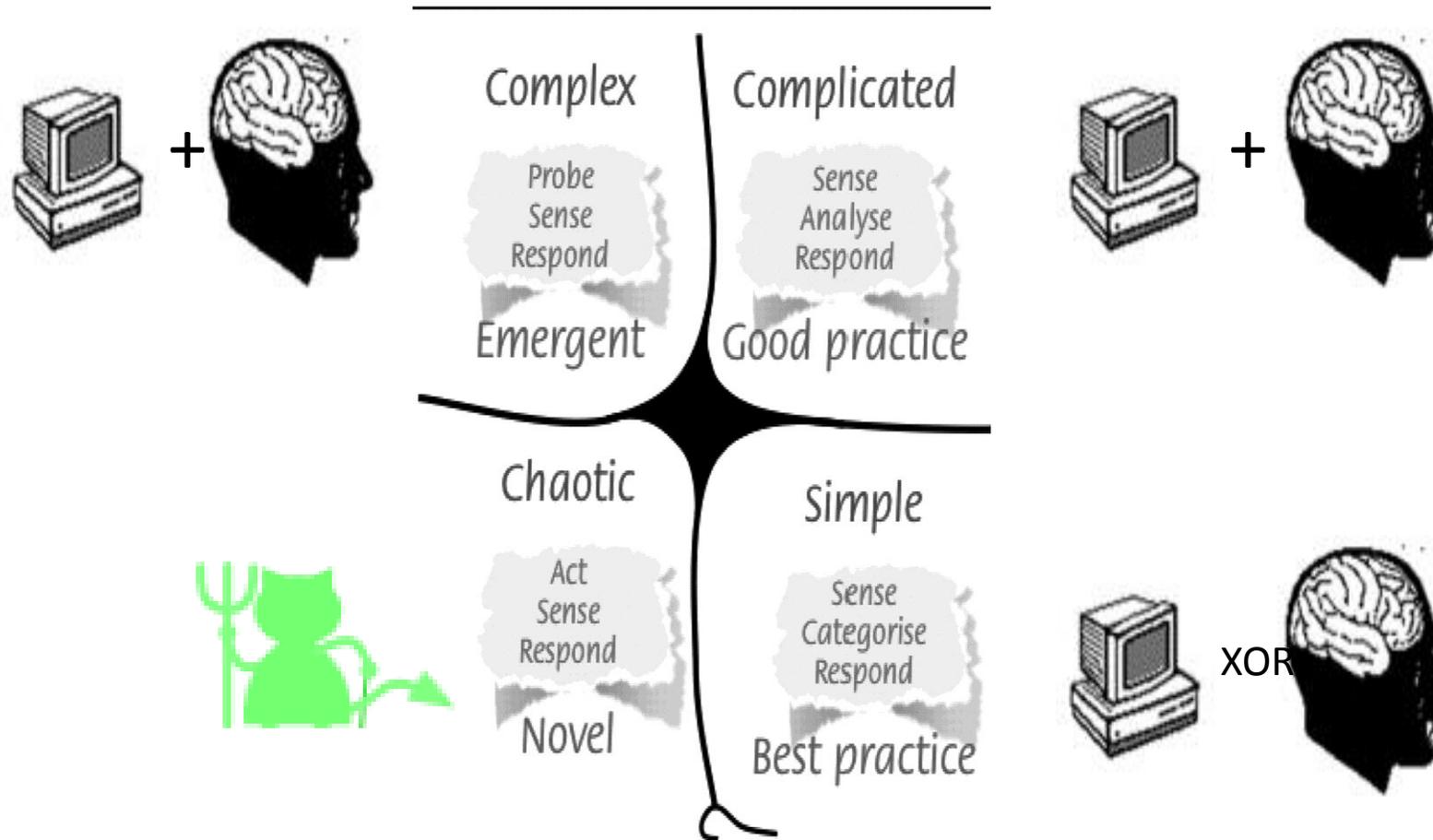
Case Name	Display Name	Case Type	Case Desc.	Case Def. Domain	Case Def. Domain Category	Finding Filter Value	Result Filter Value
Zika_Positive	Positive Zika Tests	Not Sure if needed	This group represents Positive Zika tests. It may not contain all newly added Zika labs.	Orders	Laboratories	ZIKA	Detected

SQL:

```

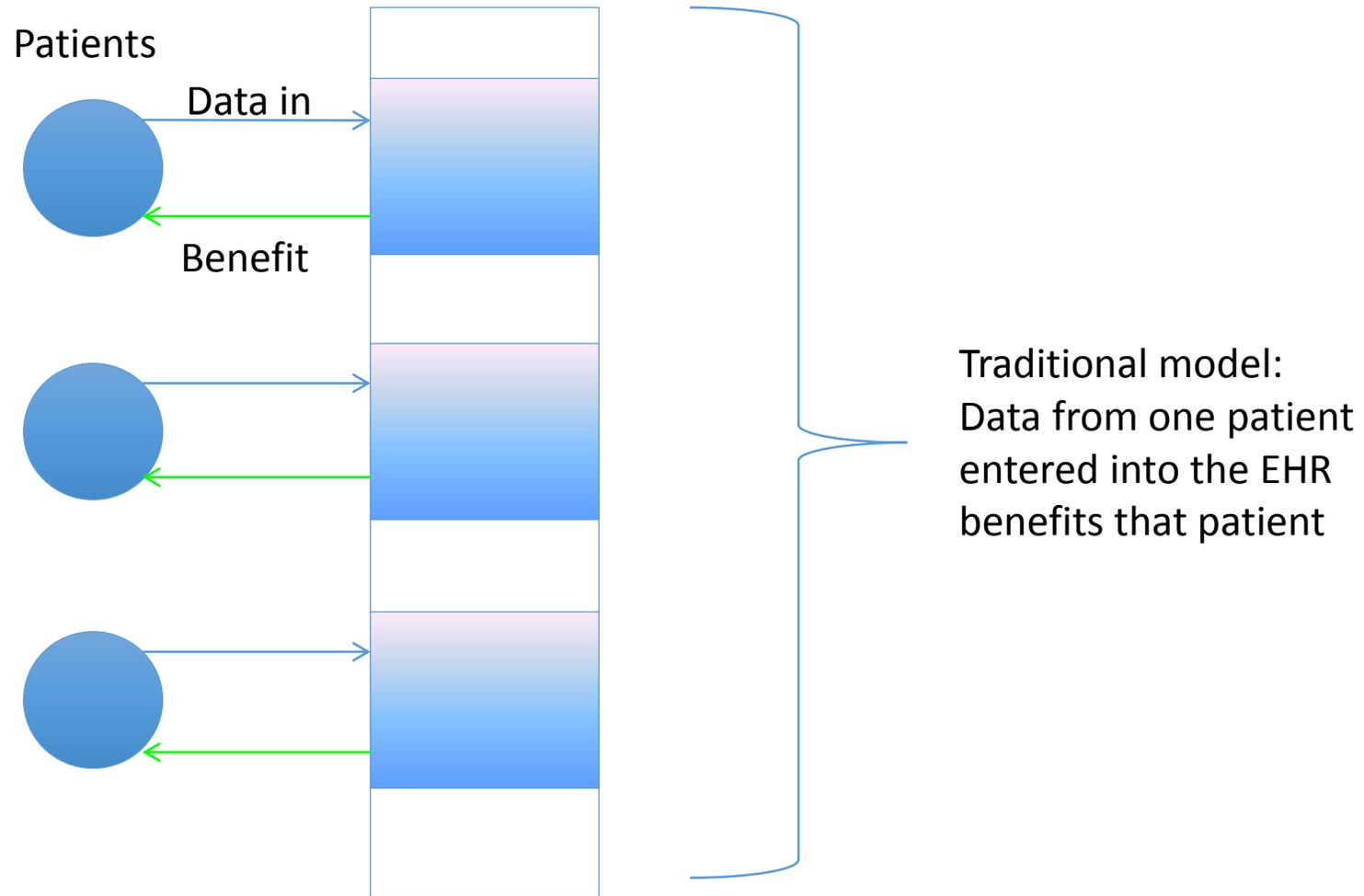
SELECT CDH.[CaseDef_HeaderBID]
,CDH.[Name]
,CDT.[TargetTable]
,CDT.TargetTableDate
,LC.[LabChemSpecimenDateTime] as [CaseDate]
,[Dim].[fnMakeDateBID](LC.[LabChemSpecimenDateTime]) as [CaseDateBID]
,LC.Sta3n
,'LabChemSID' as SIDType
,LC.[LabChemSID] as CaseSID FROM [CaseDef].[Header] CDH INNER JOIN
[CaseDef].[Intersection] CDI on CDH.CaseDef_HeaderBID = CDI.CaseDef_HeaderBID INNER JOIN
[CaseDef].[Target] CDT on CDI.CaseDef_TargetBID = CDT.CaseDef_TargetBID INNER JOIN
[CaseDef].[Codes] CDC on CDI.CaseDef_CodesBID = CDC.CaseDef_CodesBID INNER JOIN
[Stage].[Chem_LabChem] LC on CDI.[SIDValue] = LC.LabChemTestSID WHERE CDH.CaseDef_HeaderBID = 1AND CDI.[FindingFilter] = 'Zika'and
Utility.fnLabPositiveSingleThreshold(LC.LabChemResultValue, LC.Reffhigh) = 1
    
```

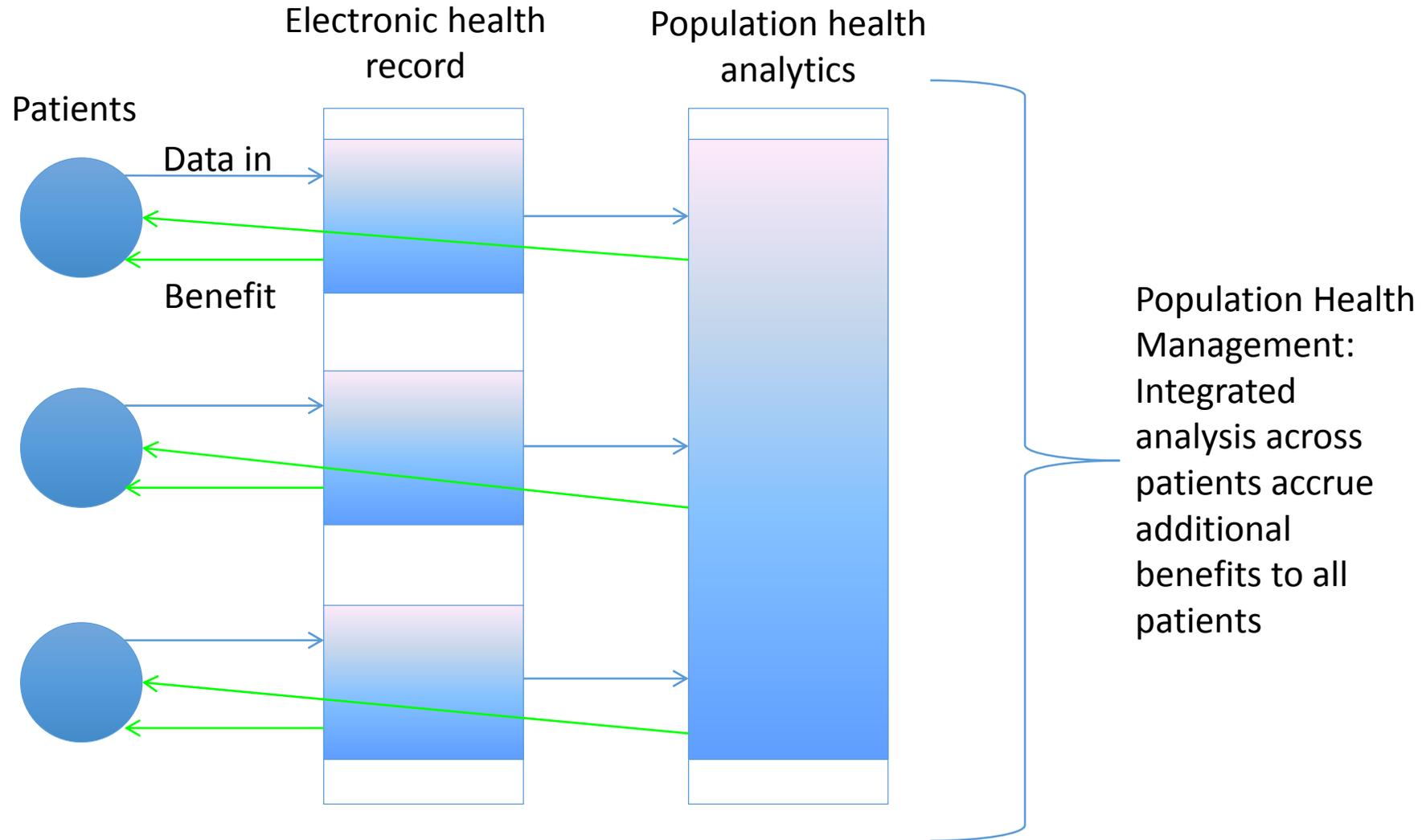
The Cynefin Framework [adapted from Snowden (Cognitive Edge, 2010)]

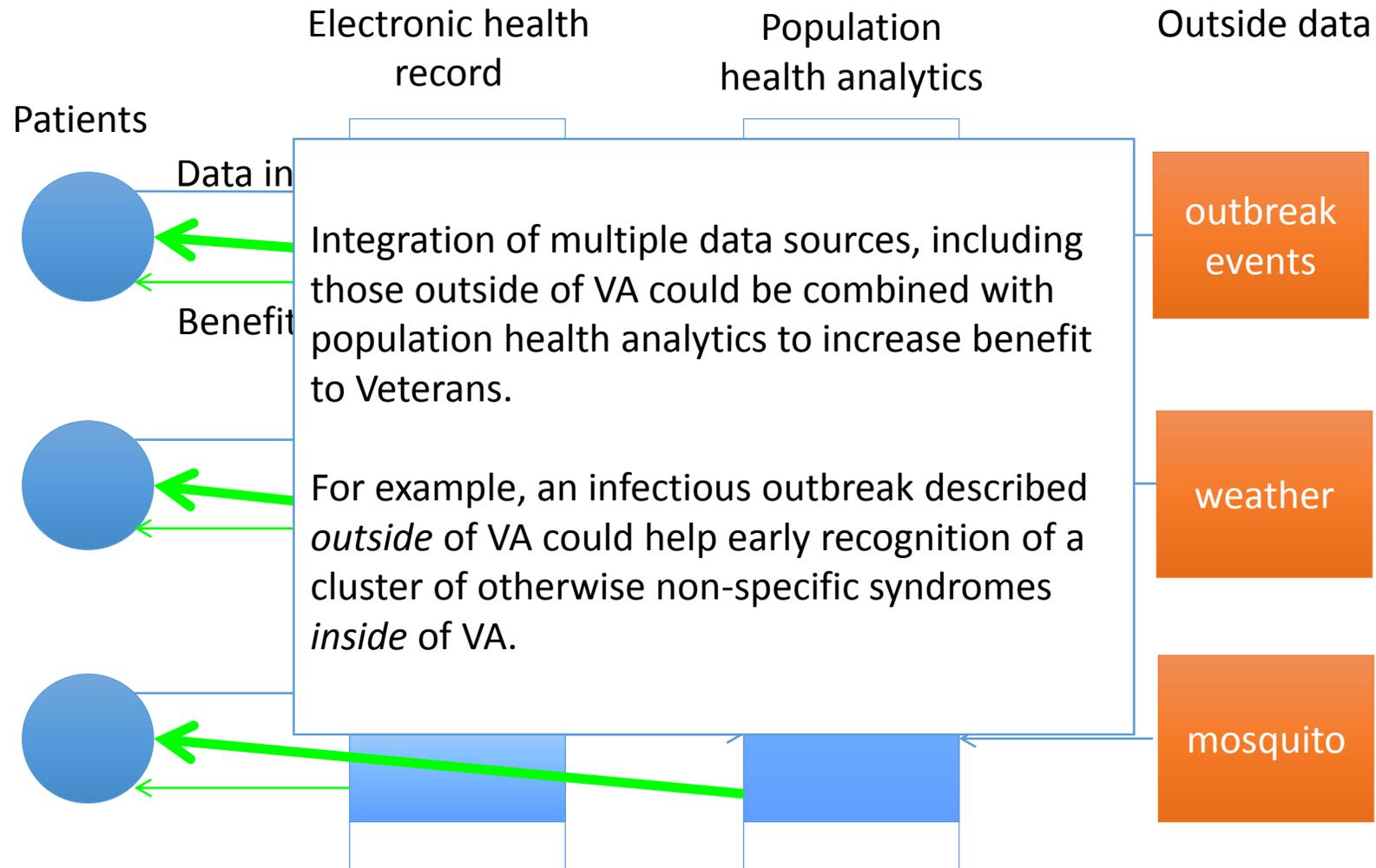


Eric K. Van Beurden et al. Health Promot. Int. 2011;heapro.dar089

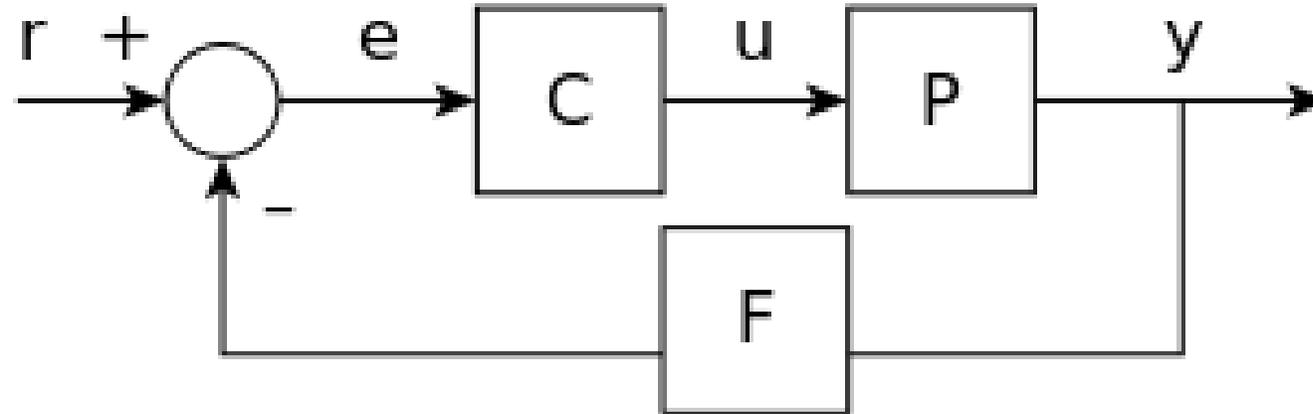
Electronic health record







Control theory



r : reference value

e : error

C : controller

u : control output

P : plant

y : output

F : sensor

Objectives, Purpose, Evidence, Constraints

- Examples
 - Decrease vancomycin by 10%
 - Decrease *Clostridioides difficile* infections by 10%
 - Decrease sepsis mortality by 10%
- What is good or bad about these?
 - Validity & Reliability
 - Feasibility
 - Specificity
 - Controllability
 - Evidence-based
 - Within your charge
 - Will others get it?
 - Does it matter?
 - Is your organization ready?
 - Is this an EHR function?

*WIG: from Stephen Covey

Operationalization and Data Provenance

(worksheets 1 & 2)



Jan Saenredam,
1604

User stories

see worksheet 3

- As a [Role]
- I want to _____
- So that _____
- Priority _____

PARiHS (Promoting Action on Research Implementation in Health Services; see worksheet 4)

- Evidence
- Context
- Facilitation

See worksheet 5

As a [Role]	I want to _____	So that _____	Priority

“User stories”
 Fill in the blanks for everything you need to do with your metric and prioritize, e.g., compare it with others, track it over time.

Objective: what are you trying to fix?
 Why are you trying to fix it?
 Constraints: think of what could go wrong.

What do you want?

Objective	Why	Constraints

What do you need?	Why	Alternatives

What do you have?

Outline what you have to devote to the project. Be realistic.

Evidence	Context	Facilitation

What would you need that you don't have. Anticipate the need to pitch to others by having a ready answer for “why” and what else could work.

Antimicrobial Timeout

- Distributed hardcopy to teams that have potential “time out” patient
- Housestaff could request access to the dashboards
- “One-stop” visual aid having relevant microbiological, clinical and antibiotic data
- Attestation of the timeout

PATIENT NAME – Last4 Ward/Room-Bed: Ward 1 / Bed 1					
Antibiotics					
Antibiotic		Start/Stop Date		Day #	
DAPTOMYCIN		7/7 to Present		2	
VANCOMYCIN		7/3 to 7/5		3 - Inactive	
Recent Vitals/Labs					
Vitals			Labs		
Temp:	97.7	7/07 5:47 PM	WBC:	7.2	7/07 5:00 AM
Pulse:	58	7/07 5:47 PM	SCr:	5.42	7/07 5:00 AM
RR:	20	7/07 5:47 PM	CrCl:	16	7/07 5:00 AM
BP:	106/57	7/07 5:47 PM	Vancomycin:	12.6	7/05 5:00 AM
7 Day Lab/Vital Trends by Date					
Microbiology					
Date: 7/3/2013 10:33:00 AM Collection Site: BLOOD			Organism ID Pending		
Date: 7/3/2013 11:04:00 AM Collection Site: BLOOD			STAPHYLOCOCCUS AUREUS METHICILLIN RESISTANT (MRSA): A/C:R, A/S:R, CFZ:R, CIP:R, CLI:R, DAP:S, EM:R, GEN:S, LVX:R, LZD:S, MXF:R, OXA:R, PEN:R, Q/D:S, RIF:S, T/S:S, TET:S, VAN:S		

Stop and think

Themes	Description
Captures and controls attention	<i>“Like as a resident you try to, of course, avoid unnecessary use of antibiotics regardless, so it’s kind of like, it reminds us to think about it...”</i>
Enhances informed and deliberative reasoning	<i>“It makes you think twice.”</i>
Redirects decision direction by making inappropriate vancomycin and piperacillin/tazobactam discontinuation easier than continuation	<i>“No, seriously, the fact that they handed me this form in the morning saying, oh, we’re tracking your vanco usage made me not want to use it.”</i>
Fosters autonomy and improves team empowerment	<i>“I think the template is good in that it forces the team to really discuss it.”</i>
Limits use of emotion-based heuristics.	<i>Clinician 1: “And when we speak to the pharmacist as well, if they’re saying, well, I don’t see why you’re choosing this antibiotic; why don’t you just choose this? We can say to them person to person, look, my concern...my clinical concern is high enough I think they need more aggressive therapy at least for right now and usually they will agree to that because it’s clinical judgment; it comes down to that so the template kind of does the same thing, so...” Clinician 2: “... You can say that about everybody and put everybody on vancomycin...”</i>

Total Antibiotic Use Before & After Intervention: Trend Analysis

All use* Per 1,000 pt-days	Implementation Period		% change [#] (95%CI), p
	Pre-	Post-	
Vancomycin	102.7	76.4	-13% (-22%, -4%), 0.01
Piperacillin/tazo	52.6	49.3	0.2% (-13%, 16%), 0.98

- Days of therapy with vancomycin or piperacillin per 1,000 days among ALL hospitalized patients in primary intervention areas

Adjusted for time since the intervention

The use of non-vancomycin, anti-MRSA antibiotics showed a non-significant decrease during the study period