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# **A Texas Response to Antimicrobial Resistance**

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**Michael Fischer, M.D., MPH & TM**

**Antimicrobial Stewardship Expert**

**Health Care Safety Group**

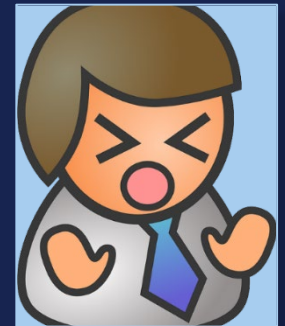
**Emerging & Acute Infectious Disease Branch**

**Texas Department of State Health Services**



# Objectives

1. The "Antimicrobial Stewardship Expert"
  - Role & Scope
2. The CDC's Seven Core Elements of an ASP
3. Antimicrobial Stewardship Programs (ASP) Data
  - Nationally & Statewide
4. Key issues in the implementation of the core elements of an antimicrobial stewardship program



# Texas DSHS Antimicrobial Stewardship (AS) Expert

Direct, Coordinate, & Promote AS Initiatives, Training Opportunities, & Collaborations

- Promote AS **collaborative efforts** between **healthcare facilities, professional organizations, & public health**
- **Enhance relationships** with key stakeholders
- **Act as a resource** & subject matter expert on:
  1. Antimicrobial stewardship program (ASP) implementation
  2. CDC's seven core elements of an ASP
- **Promote Antibiotic Awareness Week** (November 12<sup>th</sup>-18<sup>th</sup>)  
Support:
  1. CDC's campaign "Be Antibiotics Aware"
  2. Local stakeholder's antibiotic awareness activities



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# Texas DSHS Antimicrobial Stewardship (AS) Expert

Develop a strategic public health plan that presents a unified approach to antibiotic stewardship across all healthcare settings in Texas

**ONE HEALTH:- "One World, One Medicine, One Health"**

## 1. Humans:

- Acute care hospitals
- Critical access hospitals
- Long-term care facilities
- Outpatient providers
  - ❖ Urgent care
  - ❖ Clinics
  - ❖ Dentists
  - ❖ Pharmacists

## 2. Animals:

- Animal production
  - ❖ Terrestrial livestock
  - ❖ Aquaculture
- Companion animals

## 3. Environmental:

- Plant production



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# Texas DSHS Antimicrobial Stewardship (AS) Expert

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- Elevate awareness & use of the CDC's **NHSN** & NHSN's **MDRO**, **C. Diff**, & **AUR modules** for reporting & promote the conferment of rights to DSHS.
- Identify **key stakeholders** & common **perceptions** on the **benefits & barriers** to ASP implementation
- Identify healthcare facilities with **persistence of MDROs**, in the presence of appropriate infection prevention measures, for **AS evaluation & intervention**

# Texas DSHS, Key Stakeholders, & Collaborative Efforts

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DSHS is working with key stakeholders in developing & promoting collaborative ASPs in Texas:

- City of Houston Health Department (AS Executive Committee)
- Austin Public Health (CRE Task Force)
- TMF Health Quality Institute
- Texas Medical Association (TMA)
- Texas Hospital Association (THA)
- Texas Organization of Rural & Community Hospitals (TORCH)
- UT School of Nursing, the Center for Excellence in Aging Services and LTC
- The National Healthcare Executive Forum (National Governing Board Member)

# Other AS Program Activities

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## ANTIBIOTIC AWARENESS WEEK

- Promote local & regional activities & events during antibiotic awareness week (AAW)
- Promote central office antibiotic awareness week activities by:
  - Participating in CDC web & other social media events
  - Promote awareness through postings on the DSHS AS & AAW webpages
  - Speak & attend antimicrobial awareness week events in Texas



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# The Primary Goal of ASPs in Healthcare Facilities

**Optimize** Clinical Outcomes  
While **Minimizing** ...



Unintended consequences of antimicrobial use, including toxicity



Selection of pathogenic organisms  
(such as *C. difficile*)



Emergence of resistance



Health care expenditures





# Antimicrobial Stewardship

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## Definition

Coordinated interventions designed to improve & measure the appropriate use of antimicrobials by promoting...

## The 5 "D's"

1. **Diagnosis** (Reduce or Prevent inappropriate diagnoses)
2. **Drug Choice** (Empirical therapy –narrow as narrow can be, evidence based)
3. **Dose** (Is too much of anything a bad thing?)
4. **Duration of therapy** (Longer is not always better)
5. **De-escalation**
  - Based on microbiology results around the day 3 therapy point; the empiric antimicrobial(s) that were started are stopped or reduced in number and/or narrowed in spectrum
  - Intravenous to oral switch



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# Why focus on antimicrobial stewardship?



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In the U.S., antibiotic resistance is associated with:

- **2 million resistant infections**
- **23,000 deaths**
- **\$20 billion in costs**

**ANNUALLY!!!**

**(data from 2008)**



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# Incentives for implementing and ASP

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- **The Joint Commission Antimicrobial Stewardship Standard Requirements**
- **Centers for Medicare & Medicaid Services (CMS) Regulations (LTCFs)**

# The Joint Commission

- The Joint Commission recently announced a new Medication Management (MM) standard for hospitals, critical access hospitals, and nursing care centers.
- **Standard MM.09.01.01** addresses antimicrobial stewardship
  - **Published in:**
    - “The Comprehensive Accreditation Manual for the Critical Access Hospital, Hospital, and Nursing Care Center Accreditation Programs”
      - Lists the New Antimicrobial Stewardship Standard requirements
  - **Effective January 1<sup>st</sup>, 2017:**

[https://www.jointcommission.org/assets/1/6/New\\_Antimicrobial\\_Stewardship\\_Standard.pdf](https://www.jointcommission.org/assets/1/6/New_Antimicrobial_Stewardship_Standard.pdf)

# Centers for Medicare & Medicaid Services (CMS) Regulations

## Long-Term Care Facilities / Nursing Homes:

- October 2016 - Final rule adopted:
  - makes major changes and updates to the federal regulations surrounding **LTCFs**
- November 28, 2017 – Final rule effective:
  - LTCFs must adopt an Antimicrobial Stewardship Program in conjunction with an Infection Prevention and Control Program, which includes antimicrobial use protocols and a system for monitoring antimicrobial use

# Legislation

HB 1848:

SECTION 2. Subchapter A, Chapter 81, Health and Safety Code, is amended by adding:

- Sections 81.014 and 81.015

## **Sec.A81.014.**

LONG-TERM CARE FACILITY INFECTION PREVENTION AND CONTROL PROGRAM.

Each long-term care facility 's infection prevention and control program **must include:**

- 1) monitoring of key infectious agents, including multidrug-resistant organisms; and
- 2) procedures for making rapid influenza diagnostic tests available to facility residents.

# Legislation

Sec. 81.015.

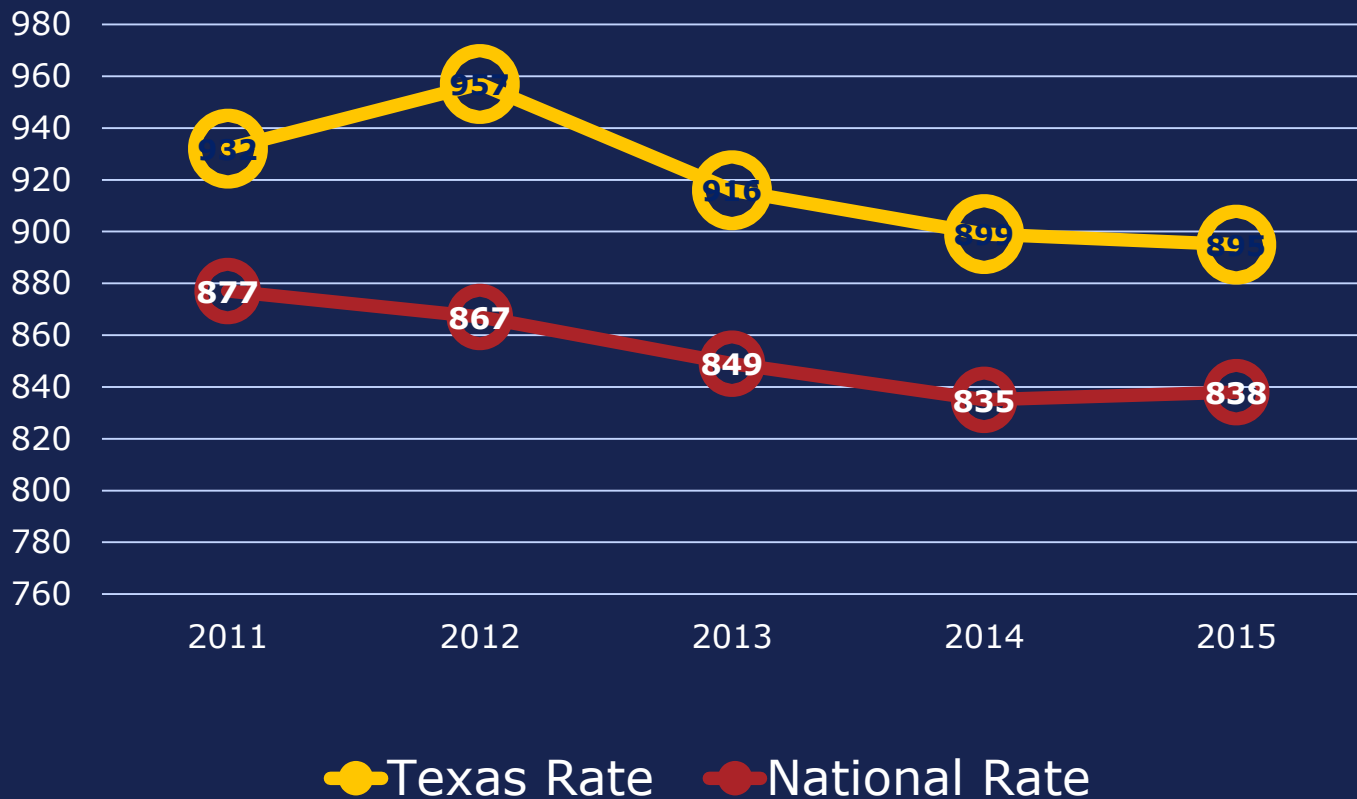
ANTIMICROBIAL STEWARDSHIP REGIONAL ADVISORY COMMITTEES.

- a) The department shall establish a regional advisory committee in each public health region designated under Section 121.007 to address antimicrobial stewardship in long-term care facilities and to improve antimicrobial stewardship through collaborative action.
- b) A regional advisory committee established under this section must include:
- 1) physicians;
  - 2) directors of nursing or equivalent consultants with long-term care facilities;
  - 3) public health officials knowledgeable about antimicrobial stewardship; and
  - 4) other interested parties.

This Act takes effect September 1, 2019.

# Outpatient Use of Antibiotics: Texas vs National Rates of Antibiotic Prescriptions Dispensed in U.S. Community Pharmacies Per 1000 Population by Year (2011-2015)

## All Classes of Antibiotics



Source: Patient Safety Atlas - Outpatient Antibiotic Use Data:  
<https://gis.cdc.gov/grasp/PSA/AUMapView.html>





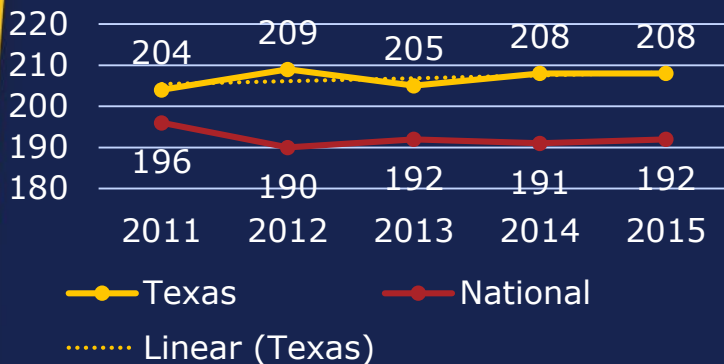
# Outpatient Use of Antibiotics: Texas vs National Rates of Antibiotic Prescriptions Dispensed in U.S. Community Pharmacies Per 1000 Population by Year (2011-2015)



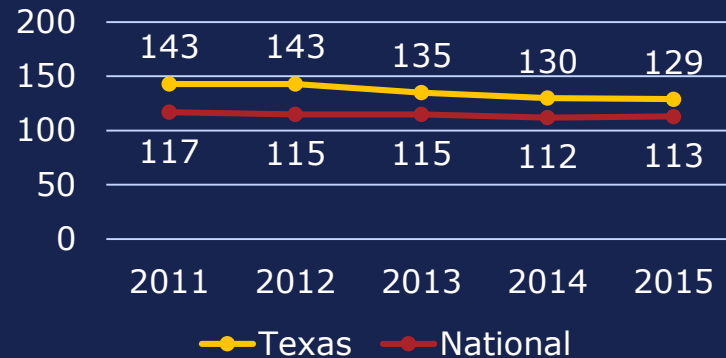
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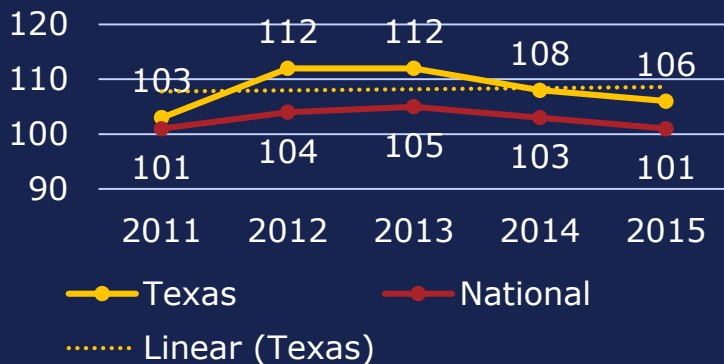
## Penicillins



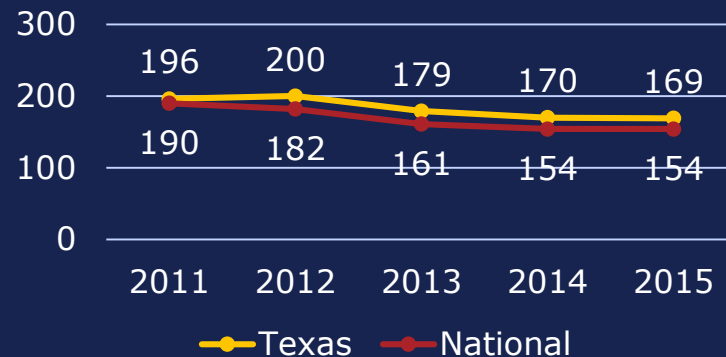
## Cephalosporins



## Fluoroquinolones



## Macrolides



Source: Patient Safety Atlas - Outpatient Antibiotic Use Data:

<https://gis.cdc.gov/grasp/PSA/AUMapView.html>

# CDC's 7 Core Elements of an ASP



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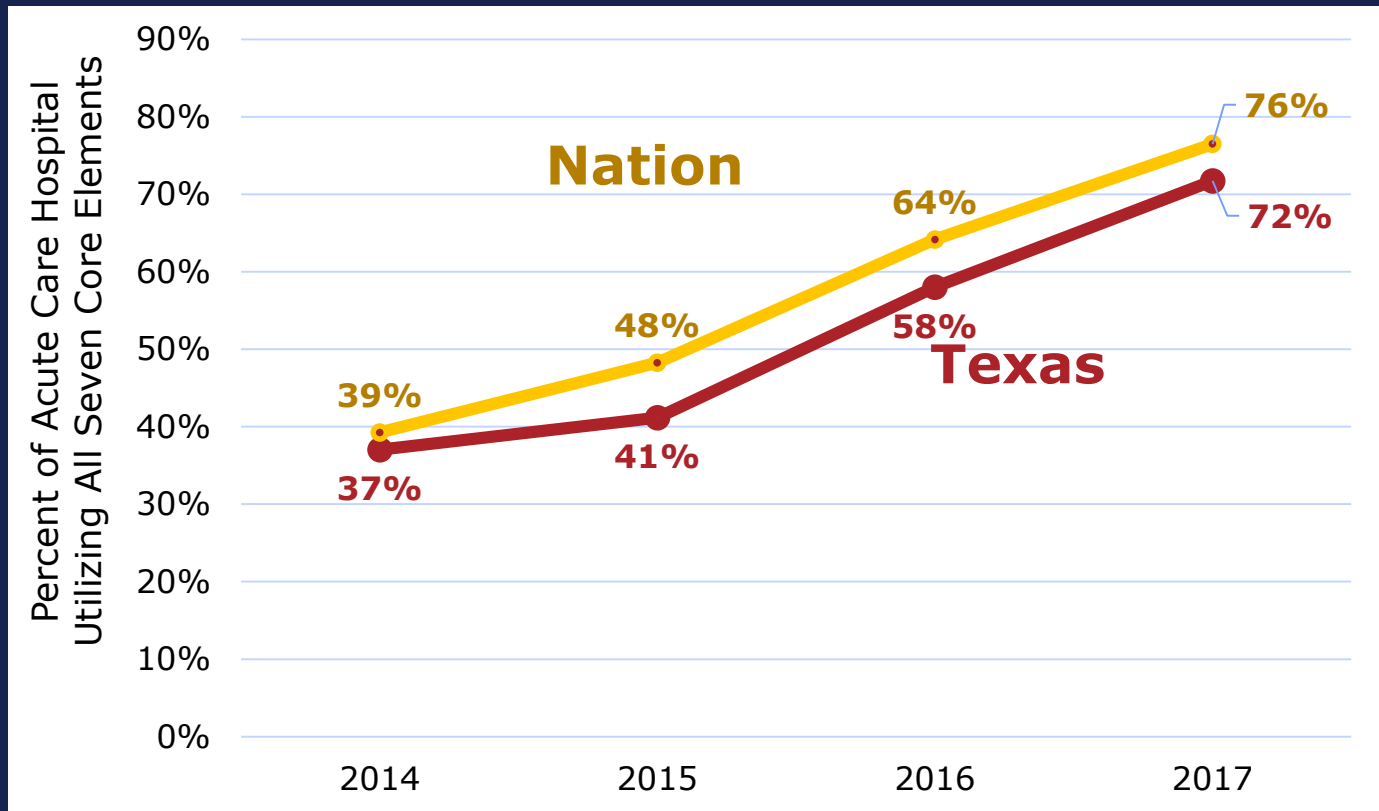
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<https://www.cdc.gov/antibiotic-use/healthcare/pdfs/core-elements.pdf>

1. Leadership Commitment
2. Accountability
3. Drug expertise
4. Action to improve use
5. Tracking
6. Reporting
7. Education

# CDC's Report on NHSN Data

## Texas & National Counts for ACHs Utilizing All Seven Core Elements



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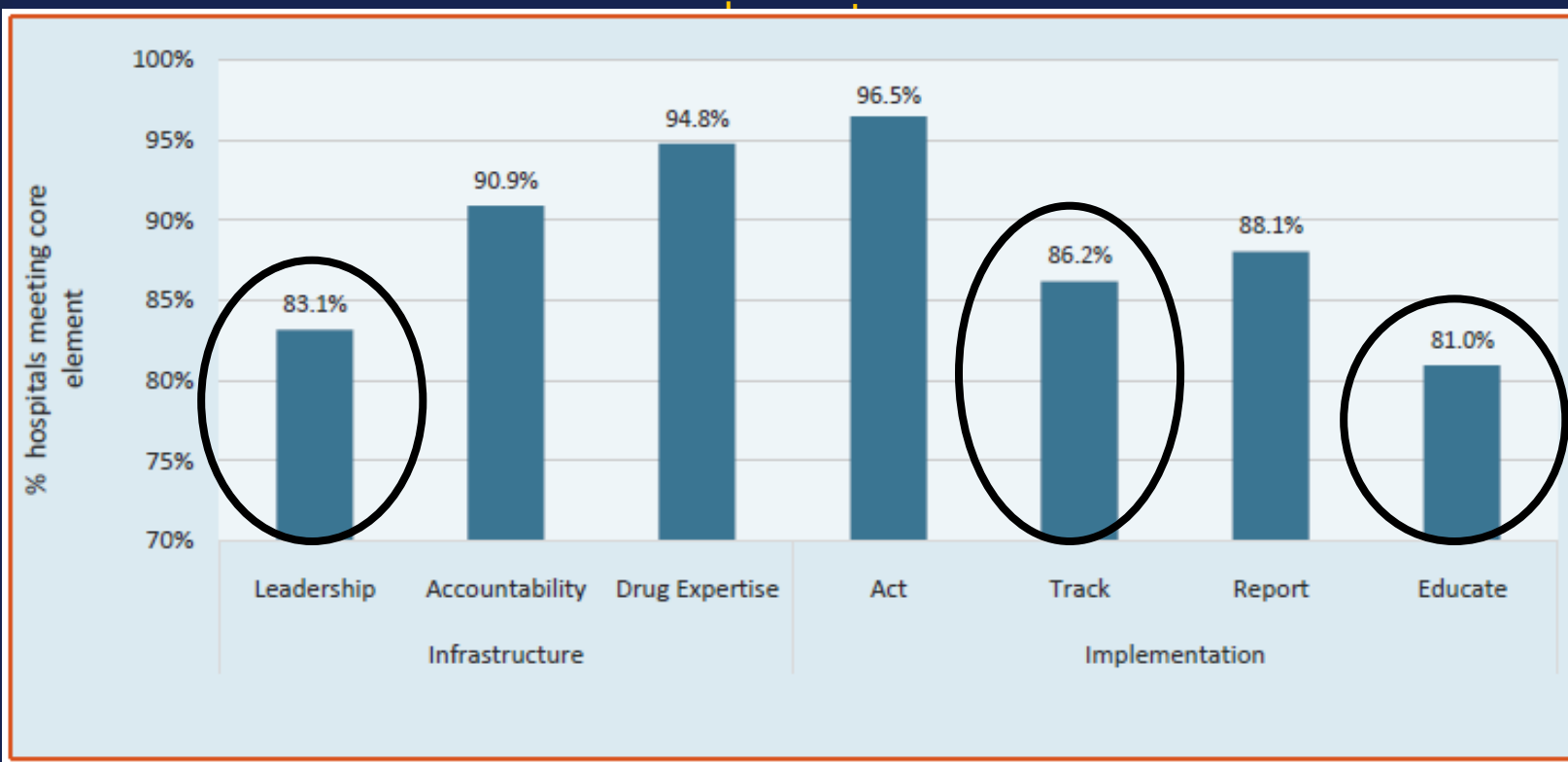
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NHSN Data is self-reported by facilities  
<https://gis.cdc.gov/grasp/PSA/STMapView.html>



## Uptake of CDC's Core Elements, 2016

Of the 4,781 U.S. acute care hospitals responding to the 2016 NHSN Annual Hospital Survey, 3,063 (54.1%) reported uptake of all 7 core



Source: Melinda M. Neuhauser, David Hyun. Antibiotic Stewardship: The National & Global Perspective. 2017 US Antibiotic Awareness Week Webcast Series. November 13, 2017.

# Percentage of U.S. acute care hospitals reporting uptake of all 7 CDC Core Elements by facility demographic

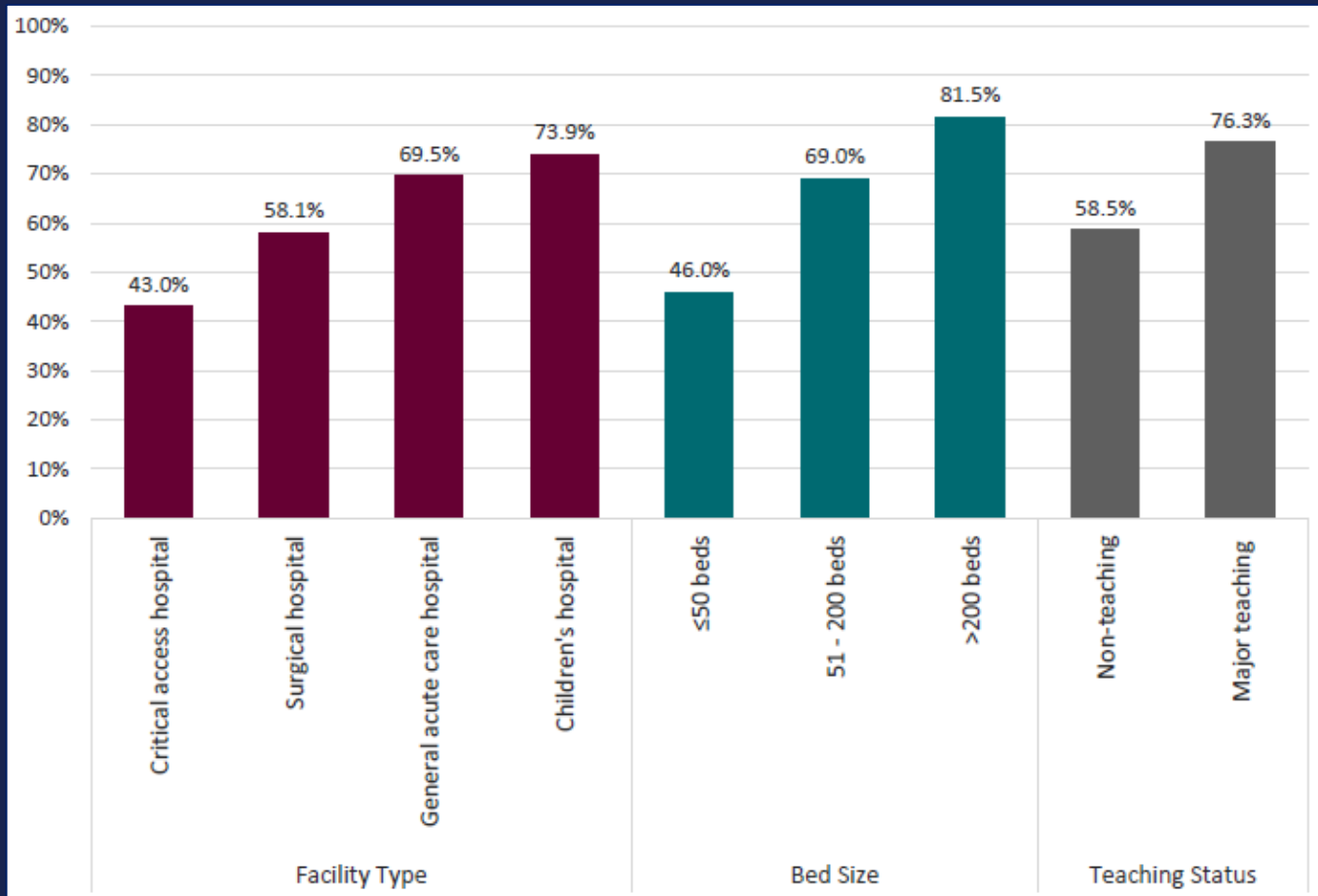
## National Healthcare Safety Network, 2016 (N=4,781)



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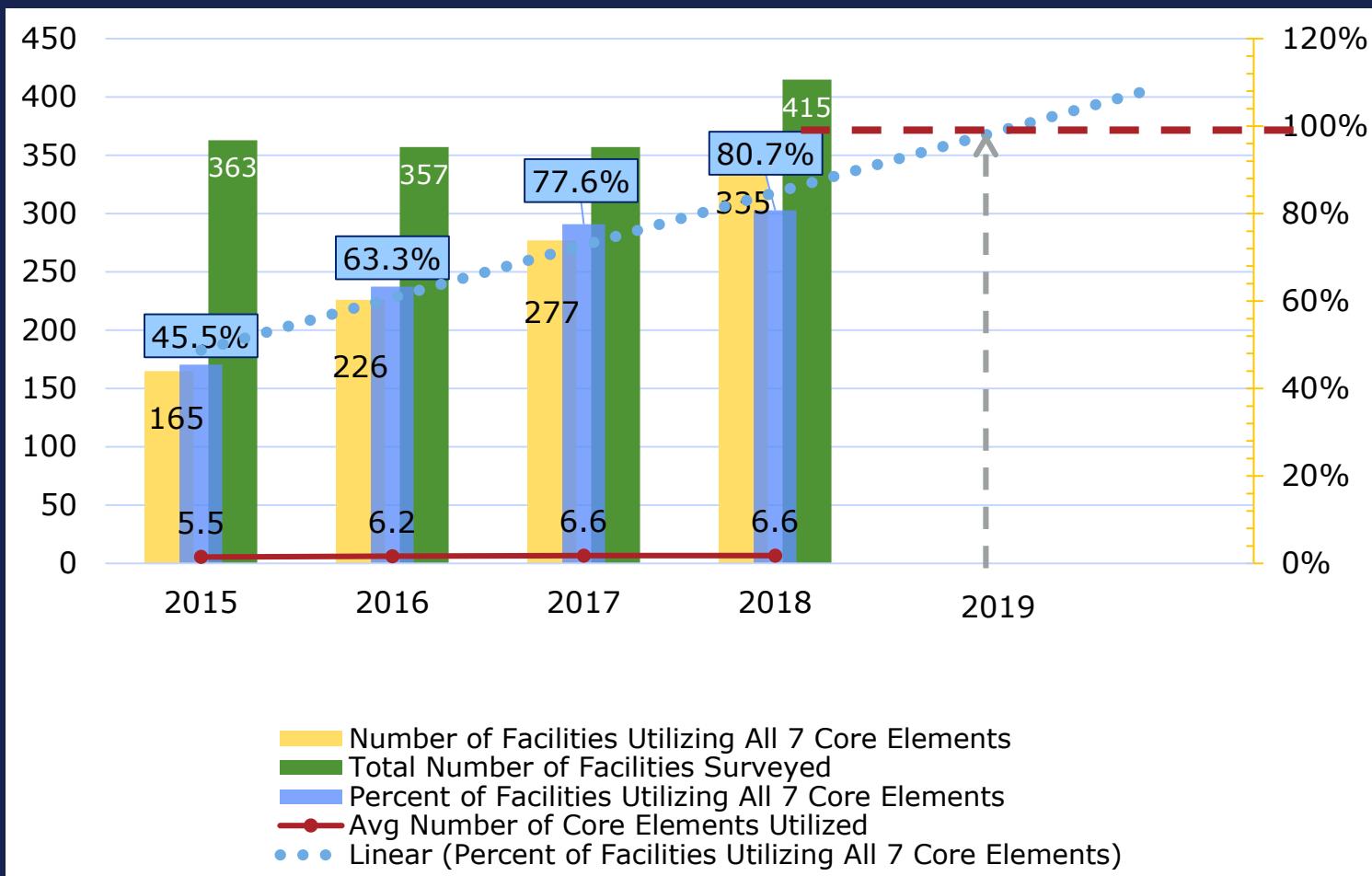
Source: Melinda M. Neuhauser, David Hyun. Antibiotic Stewardship: The National & Global Perspective. 2017 US Antibiotic Awareness Week Webcast Series. November 13, 2017.

# TxHSN Data: Percent of Texas Hospitals Utilizing All Seven Core Elements by Year (2015-2018)



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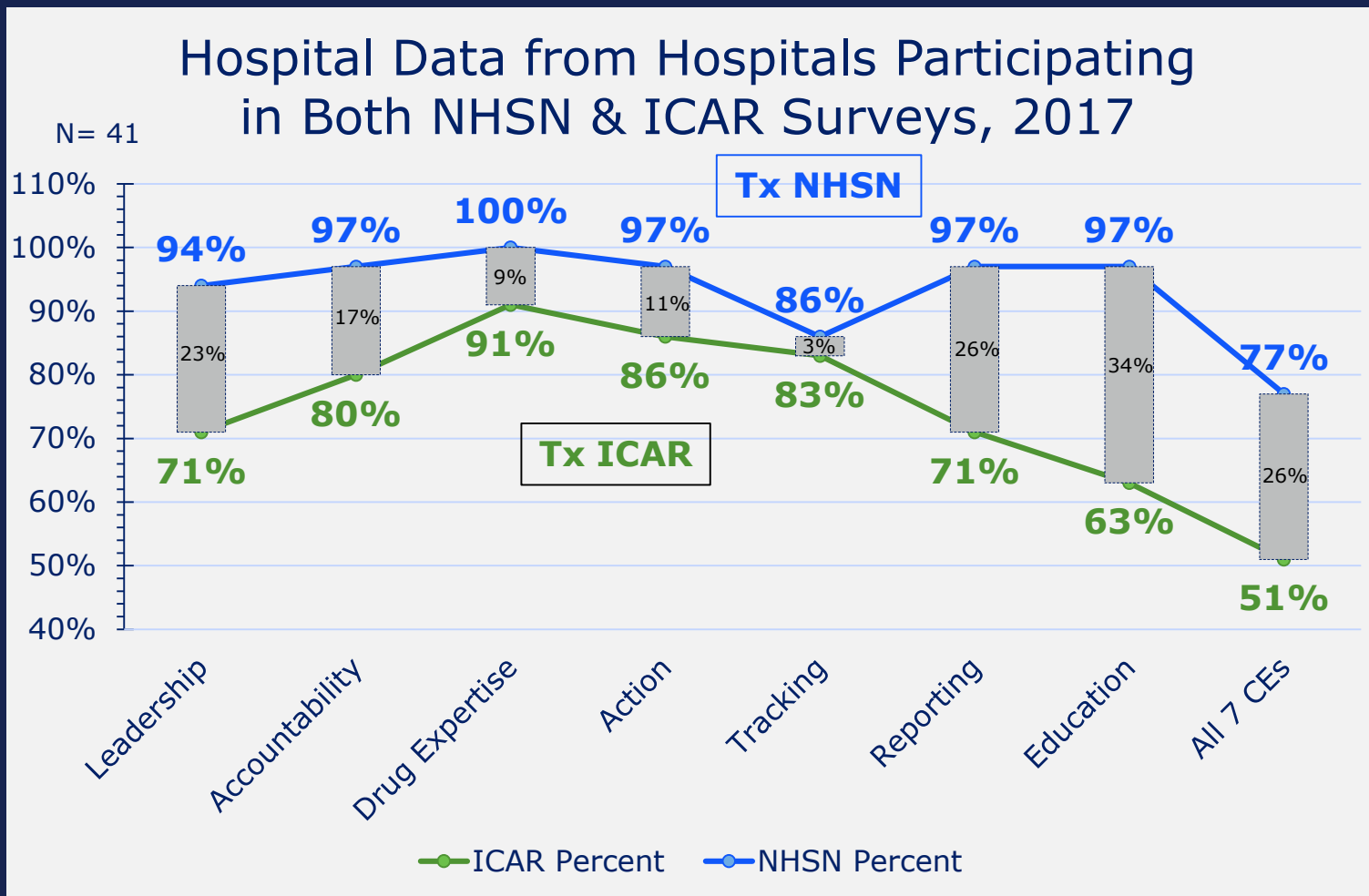


# HOSP-ACH - Data for NHSN-ICAR Matched Facilities, 2017



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**NHSN:** National Healthcare Safety Network

**TxHNSN:** Texas Healthcare Safety Network Data (NHSN data for Texas)

**Texas ICAR:** Infection Control Assessment & Response Survey

# ICAR Data:

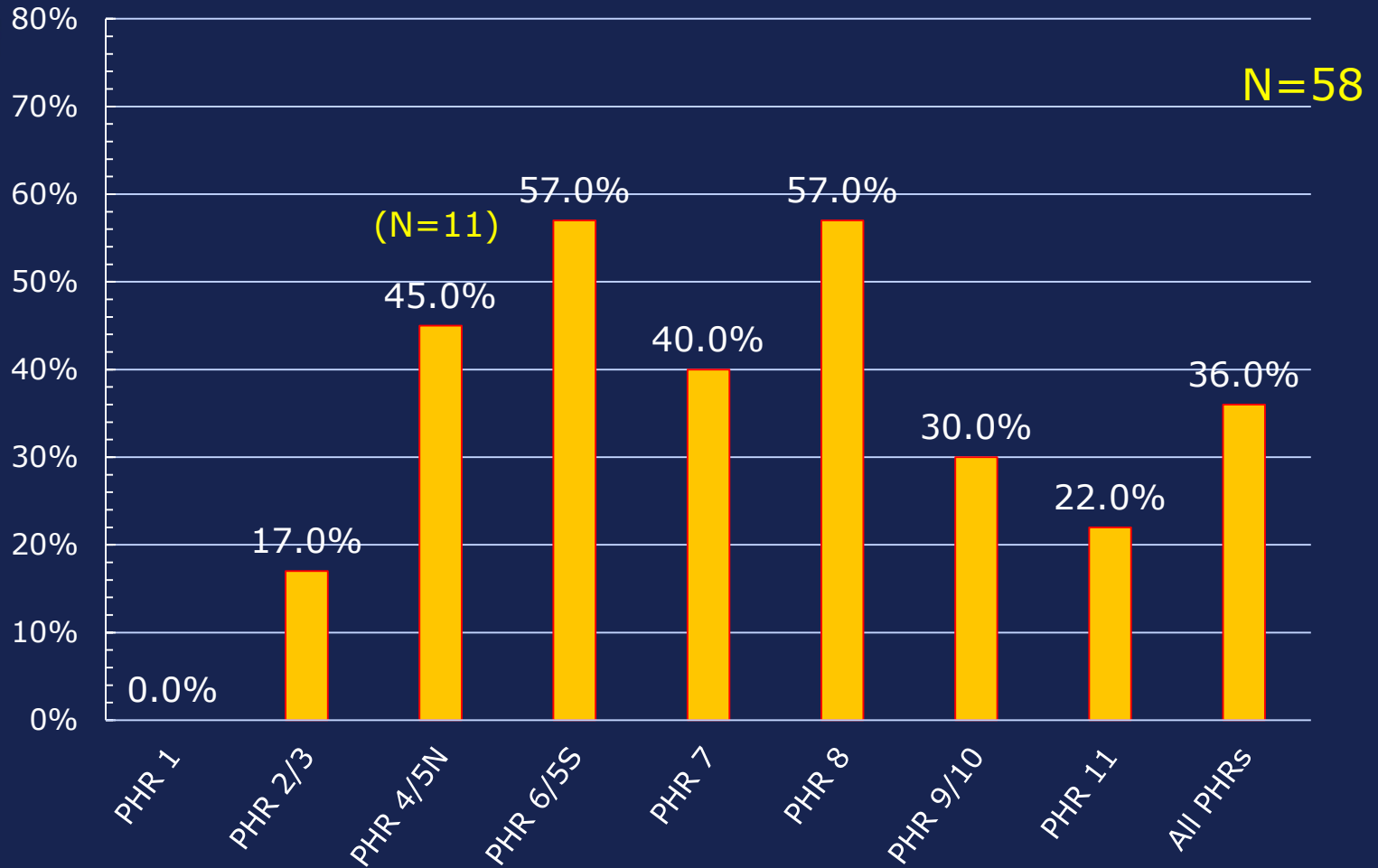
## Percent of Hospitals Utilizing All 7 Core Elements by Public Health Region (PHR)



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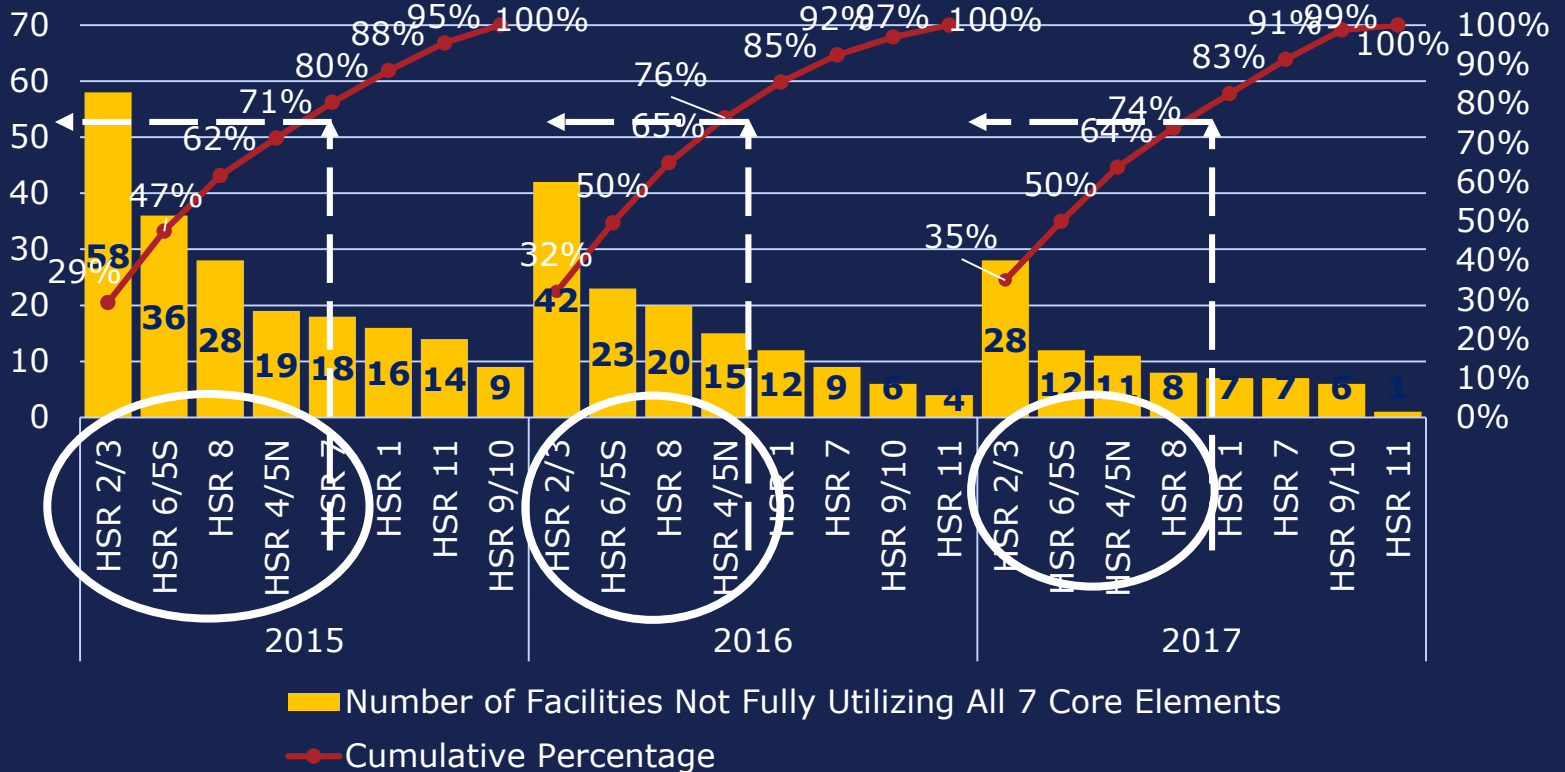
# Pareto Chart: Number of Texas Hospitals Not Utilizing All Seven Core Elements by Health Service Region (HSR) 2015-2017



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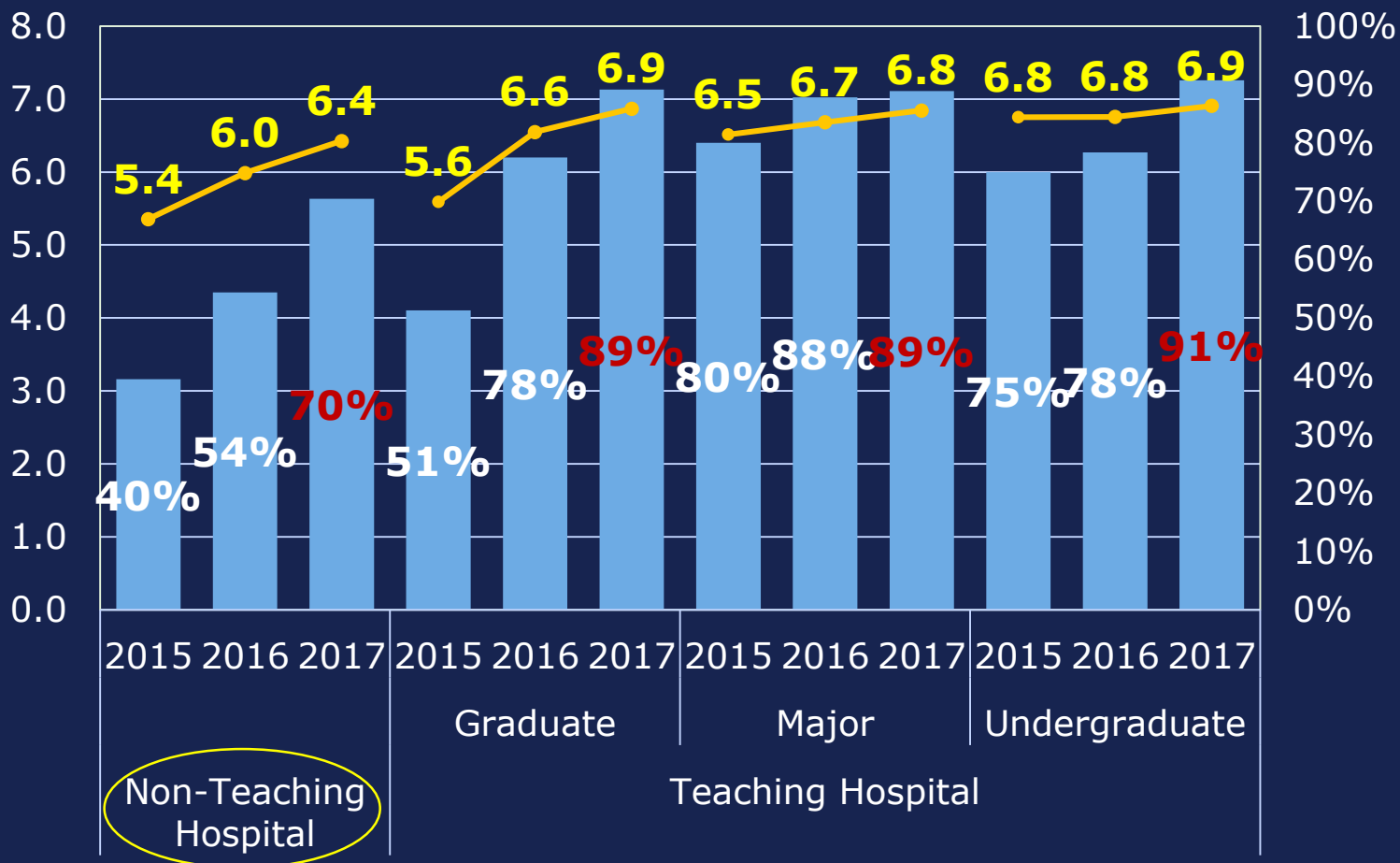


Texas NHSN Data, Annual Hospital Survey, Patient Safety Component  
HSR= Health Service Region

# Percent of Hospitals Utilizing All Seven Core Elements & Mean Number of Core Elements Utilized by Teaching Hospital Type and Year



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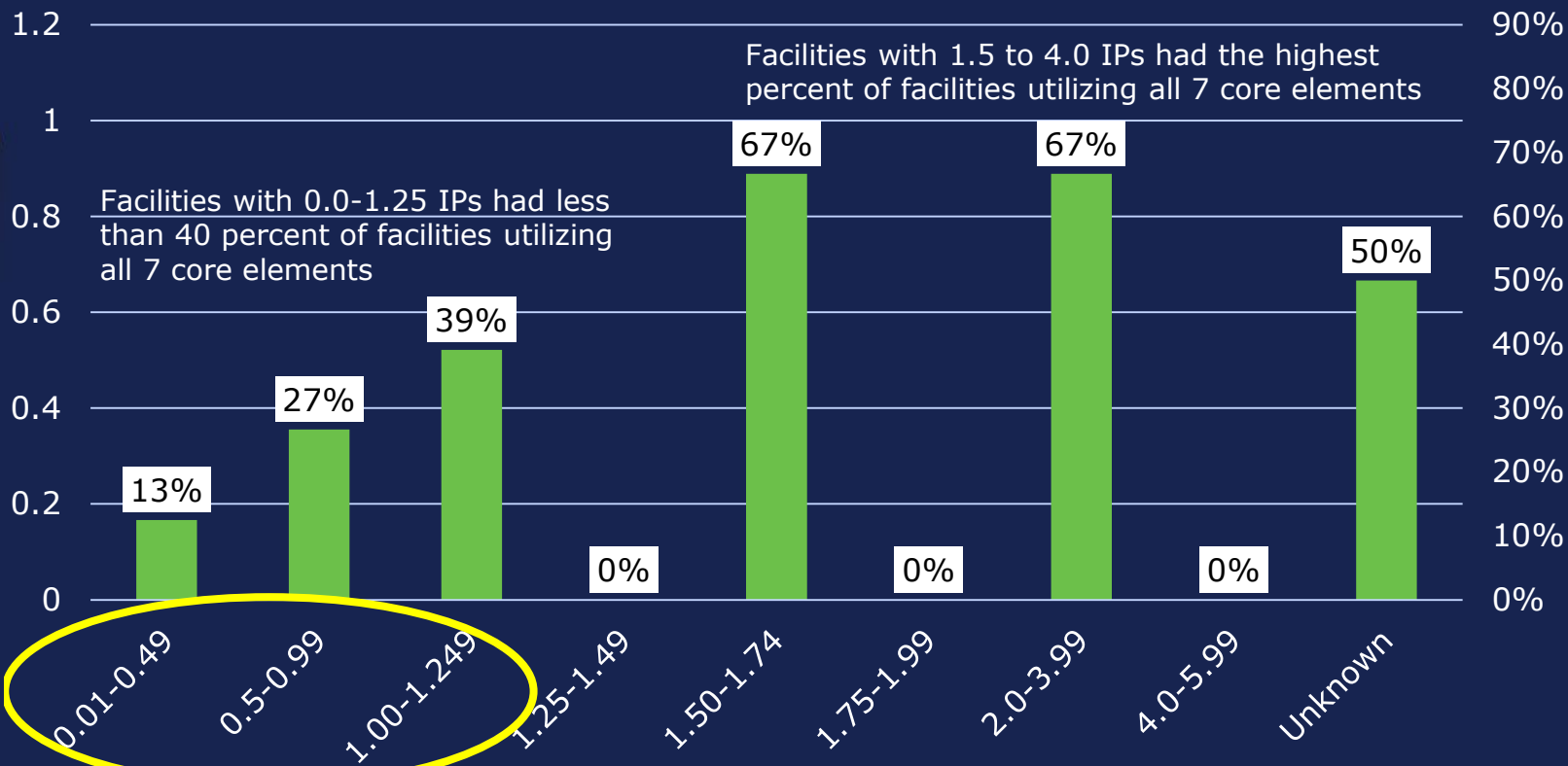
# Texas ICAR Hospital Survey Data – 2017

## Percent of Hospitals Utilizing All Seven Core Elements by Number of Infection Preventionist FTEs



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Number of IP FTEs	Number of Hospitals Surveyed	Hospitals Utilizing All 7 Core Elements		Average Number of Core Elements Utilized
		Count	Percent	
0.01-0.49	8	1	13%	3.3
<b>0.5-0.99</b>	<b>15</b>	<b>4</b>	<b>27%</b>	<b>3.9</b>
<b>1.00-1.249</b>	<b>23</b>	<b>9</b>	<b>39%</b>	<b>4.7</b>
1.25-1.49	-	-	-	-
1.50-1.74	3	2	67%	6.3
1.75-1.99	-	-	-	-
2.0-3.99	6	4	67%	6.3
4.0-5.99	1	0	0%	5.0
Unknown	2	1	50%	6.5

# Texas ICAR Survey Data – 2017

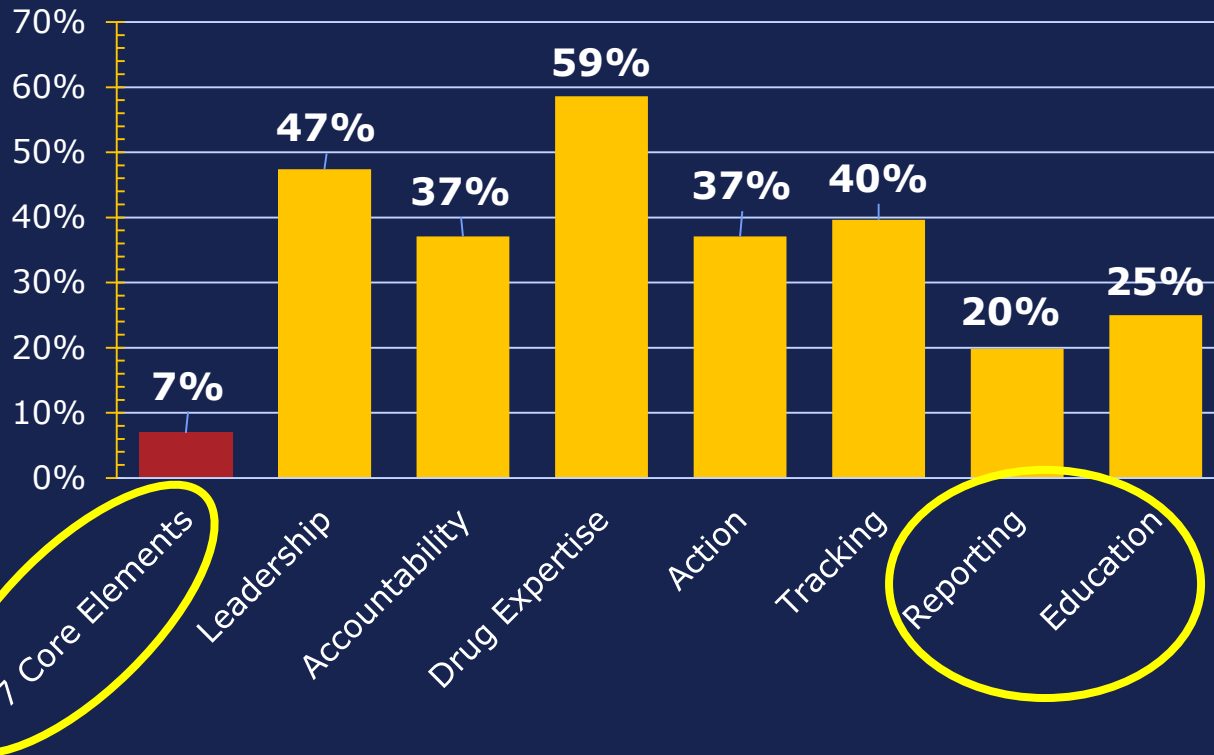
## Percent of LTCFs Utilizing the Core Elements



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With approx. 1220 Nursing Homes in Texas, estimates based on this survey suggest that:

- **Only 84 of the 1220 NHs have all 7 core elements in-place**

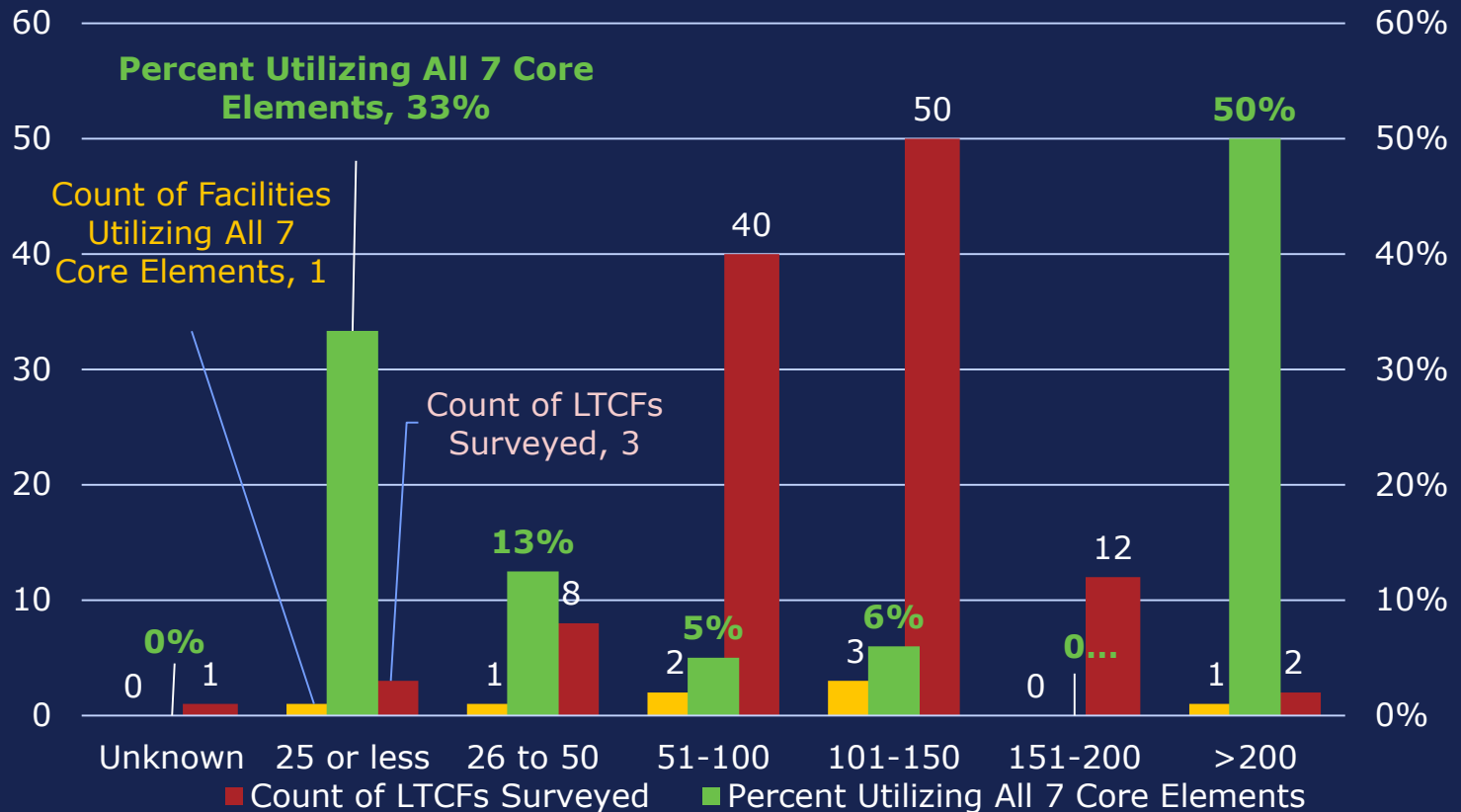
# Texas ICAR Survey Data – 2017

## Number of LTCFs Facilities Utilizing All Seven Core Elements By Number of Licensed Beds



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ICAR - Infection Control Assessment and Response; IP: Infection Preventionist; FTE: Full-Time Equivalent

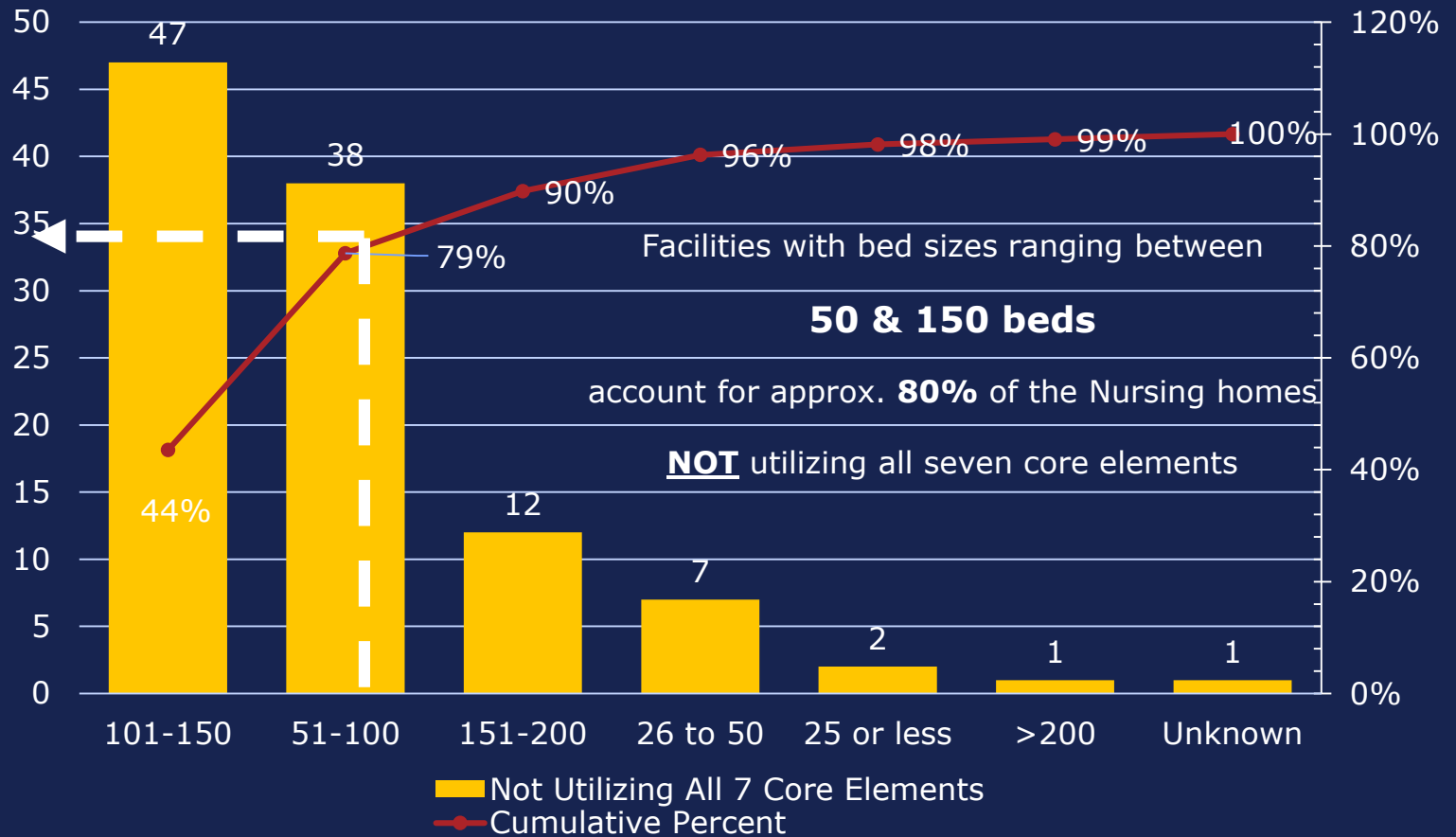
# Texas ICAR Survey Data – 2017

## Pareto Chart: Counts of LTCFs Not Utilizing All Seven Core Elements by Number of Licensed Beds



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ICAR - Infection Control Assessment and Response; IP: Infection Preventionist; FTE: Full-Time Equivalent

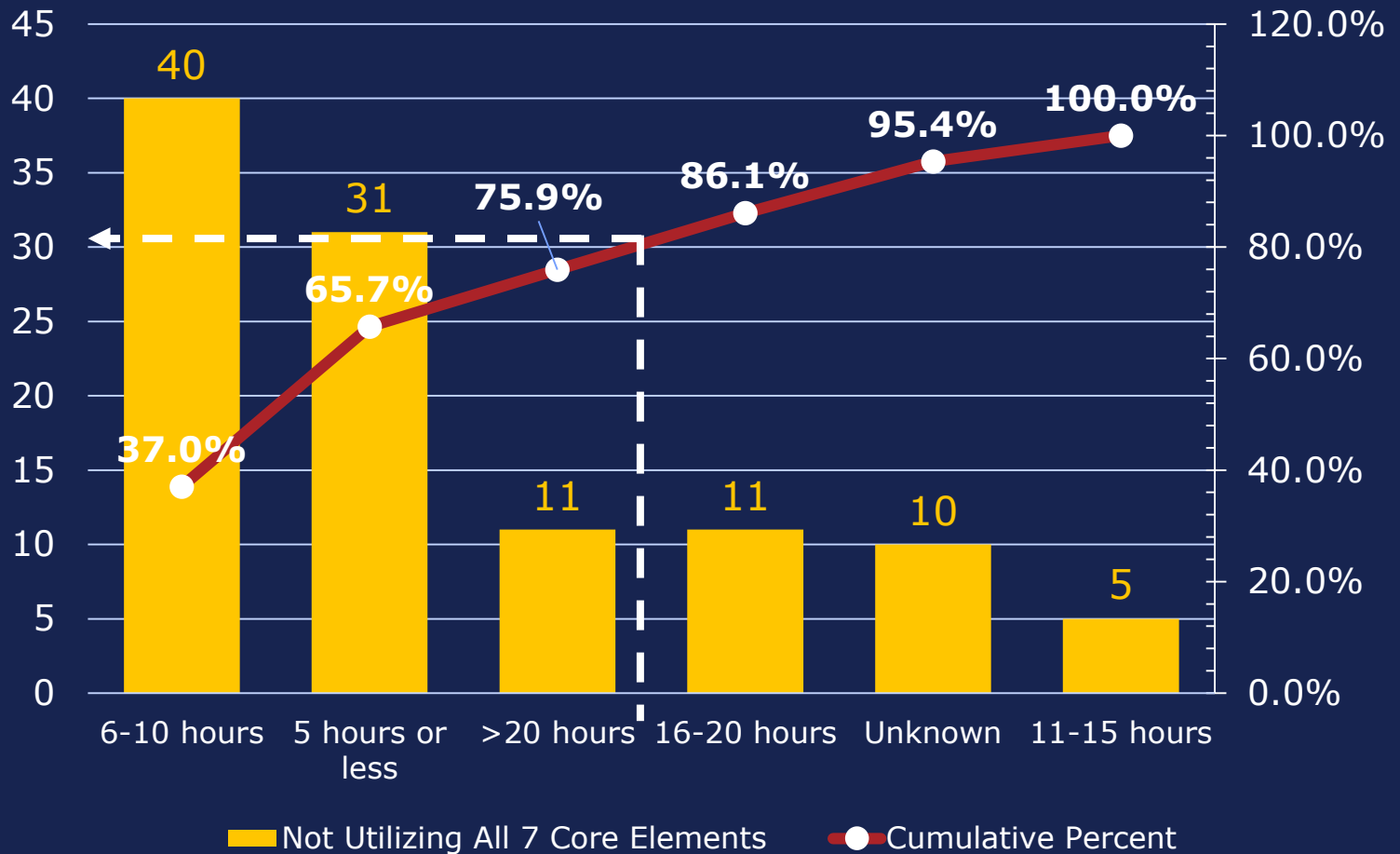
# Texas ICAR Survey Data – 2017

## Pareto Chart: Counts of LTCFs Not Utilizing All Seven Core Elements by IP Hours per Week



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# Texas ICAR Survey Data – 2017

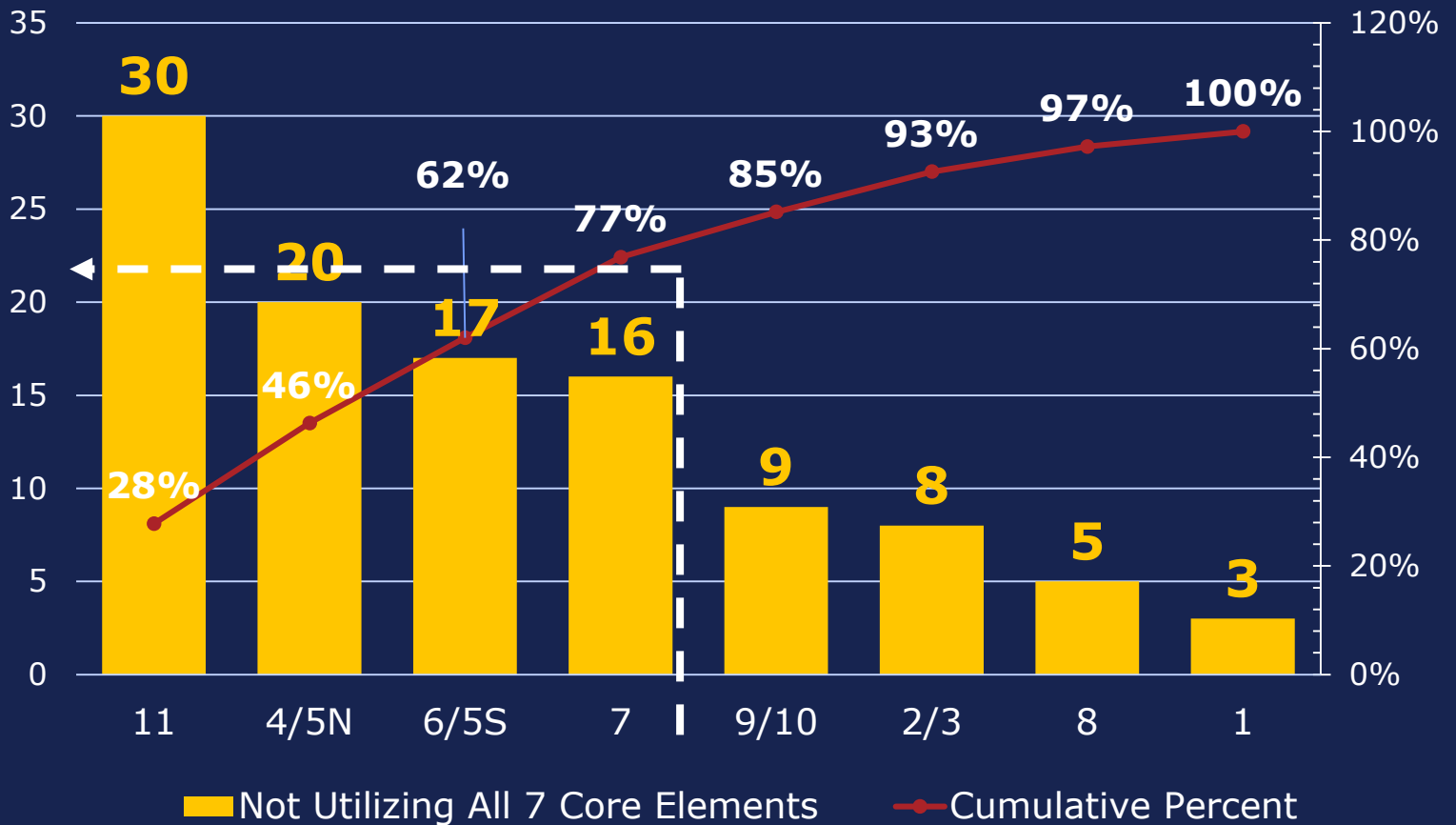
## Pareto Chart: Counts of LTCFs Not Utilizing All Seven Core Elements by HSR



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ICAR - Infection Control Assessment and Response; IP: Infection Preventionist; FTE: Full-Time Equivalent



# CDC's 7 Core Elements for Antibiotic Stewardship in Nursing Homes



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<b>Infrastructure</b>	1. Leadership Support
	2. Accountability
	3. Drug Expertise
<b>Implementation</b>	4. Actions to Improve Use
	5. Tracking: Monitoring Antibiotic Prescribing, Use, & Resistance
	6. Reporting Information to Staff on Improving Antibiotic Use & Resistance
	7. Education

Create a multidisciplinary antimicrobial teams that includes all types of staff involved in the diagnosis, lab testing (specimen collection, test ordering, etc), & antimicrobial ordering, dispensing, & administration

## CDC's 7 Core Elements

# 1. Leadership Commitment

To succeed, antibiotic stewardship programs need clear support from leadership

The dedication of necessary **human, financial, & information technology resources** are critical for an ASP to succeed

### Facility Leadership:

- ❖ **Owners**
- ❖ **Administrators**
- ❖ Leaders of the corporation
  - National &/or Regional

### Commitment demonstrated by:

- 1) **Written statements** in support of improving antibiotic use
- 2) Include stewardship-related duties in **job descriptions** for the:
  - Medical director, Clinical nurse leads, & Consultant pharmacists

- 3) **Communicate** with nursing staff & prescribing clinicians

- The facility's **expectations** about use of antibiotics
- The **monitoring & enforcement** of stewardship policies

- 4) **Create a culture promoting AS**, through:

- Messaging
- Education
- Celebrating improvement



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## 2. Accountability

**Identify & appoint leader(s) responsible for program outcomes:**

**1) Empower the **medical director** to**

- Set standards for antibiotic prescribing practices
- Be accountable for overseeing adherence

**2) Empower the **director of nursing** to**

- Set the practice standards for assessing, monitoring & communicating changes in a resident's condition by front-line nursing staff
- The importance of antibiotic stewardship is conveyed by the expectations set by nursing leadership in the facility

**3) Engage the **consultant pharmacist****

- In supporting antibiotic stewardship oversight through quality assurance activities such as medication regimen review & reporting of antibiotic use data



## 2. Accountability (continued)

**Nursing home AS leads should utilize existing resources to support AS efforts by working with:**

### 1) Infection prevention program coordinator

- Set standards for antibiotic prescribing practices
- Be accountable for overseeing adherence

### 2) Consultant laboratory

- Set the practice standards for assessing, monitoring & communicating changes in a resident's condition by front-line nursing staff
- The importance of antibiotic stewardship is conveyed by the expectations set by nursing leadership in the facility

### 3) State & Local health departments

- In supporting antibiotic stewardship oversight through quality assurance activities such as medication regimen review & reporting of antibiotic use data



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## 3. Drug expertise

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**Appoint a pharmacist leader responsible for working to improve antimicrobial use**

1. **Work with a consultant pharmacist** who has received specialized infectious diseases or AS training
2. Partner with **ASP leads** at the hospitals within your **referral network**
3. Develop **relationships with infectious disease consultants** in your **community** interested in supporting your facility's stewardship efforts



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## CDC's 7 Core Elements

# 4. Action to Improve Antimicrobial Use

## Implementation of at least 1 recommended action

### 1. Systemwide Interventions

- "Prior approval" for specified antimicrobials
- Require documentation of **diagnosis/indication**, drug, dose, & duration for all antimicrobial orders

### 2. Patient-Specific Interventions

- "Antimicrobial time-out" or "post-prescription review"
- Introduce guidance for intravenous-to-oral stepdown (IV to OP)

### 3. Diagnosis- & Infection- Specific Interventions

- Use **real-time, rapid diagnostics** such as rapid pathogen identification assays to improve appropriate antibiotic use
- Protocols for diagnosis & treatment of suspected UTIs or URI



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# CDC's 7 Core Elements for AS in Nursing Homes: ACTIONS



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<p><b>Policies</b></p>	<p>Ensure that current <b>medication safety policies</b>, including medication regimen review, are developed to address Centers for Medicare &amp; Medicaid Services (CMS) regulations <b>are being applied to antibiotic prescribing &amp; use.</b></p>
<p><b>Broad interventions</b></p>	<p><b>Standardize practices</b> which should be applied during the care of any resident suspected of an infection or started on an antibiotic</p> <ul style="list-style-type: none"> <li>• Improve the <b>evaluation &amp; communication</b> of <b>clinical signs &amp; symptoms</b> when a resident is first suspected of having an infection,</li> <li>• Optimize the use of <b>diagnostic testing</b></li> <li>• Implement an <b>antibiotic review process</b>, also known as an <b>"antibiotic time-out,"</b> <ul style="list-style-type: none"> <li>➤ <b>Antibiotic reviews</b> provide clinicians with an opportunity to reassess the ongoing need for &amp; choice of an antibiotic when the clinical picture is clearer &amp; more information is available</li> </ul> </li> </ul>
<p><b>Pharmacy interventions</b></p>	<p>Integrate the <b>dispensing &amp; consultant pharmacists</b> into the <b>clinical care team</b> as key partners in supporting antibiotic stewardship</p> <p>Pharmacists can provide assistance in ensuring antibiotics are ordered appropriately, reviewing culture data, &amp; developing antibiotic monitoring &amp; infection management guidance in collaboration with nursing &amp; clinical leaders</p>
<p><b>Infection &amp; syndrome specific interventions</b></p>	<p>Identify <b>clinical situations</b> which may be <b>driving inappropriate</b> courses of antibiotics such as asymptomatic bacteriuria or urinary tract infection prophylaxis &amp; <b>implement specific interventions</b> to improve use</p>

CDC's 7 Core Elements

## 5. Tracking

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**Monitor antimicrobial prescribing & resistance patterns**

### **Measurement Areas:**

1. Antibiotic consumption
2. Process measures
3. Outcome measures
4. Financial measures



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CDC's 7 Core Elements

# 5. Tracking (Cont.)

Antibiotic Consumption	Days of therapy (DOT) per 1,000 patient days
	Defined daily dose (DDD) per 1,000 patient days
	Antibiotic Administration Ratio (SAAR)
	Antibiotic Name/Type
	Dose
	Duration (Start Date, End Date, Planned Days Of Therapy))
	Indication & Rationale (Prophylaxis Vs. Therapeutic)
	Treatment Site (I.E., Urinary Tract, Respiratory Tract)
	Place Therapy Initiated (Nursing Home-initiated, Transferring Facility Initiated, Or Emergency Department Initiated)



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# DDD vs DOT



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## The defined daily dose (DDD):

- Focuses on **population-based parameters**
- Assumes that patients and hospitals are **homogenous entities**

Patients requiring renal adjustments:

To get similar pharmacokinetic profiles:

1. Require **fewer doses and amounts**
2. Results in **fewer DDDs**

## Days of therapy (DOT):

- Classify antibiotic days based on **patient-level exposure**
- Are simply the number of days that a patient is on an antibiotic, **regardless of dose**
- Include the underlying assumption **that antibiotic dosing was appropriate.**

If patients receive **greater than one antibiotic,**

- **More than one DOT** may be counted

Problematic if:

- Attempting to classify a composite end point of total antibiotic use.

CDC's 7 Core Elements

# 5. Tracking (Cont.)

Process Measures	Indication for antimicrobial use
	Percentage of cases where therapy is appropriate (especially for serious infections, such as sepsis)
	Appropriate Treatment of Methicillin-Sensitive Staphylococcus aureus (MSSA) Bacteremia
	Frequency at which de-escalation occurs
	Timely cessation of antibiotics given for surgical prophylaxis
	Antibiotics not prescribed to treat asymptomatic bacteria
	Appropriate cultures obtained before starting antibiotics
	Adherence to ACH/CAH/LTCF-specific guidelines
	Acceptance of ASP recommendations
	Frequency of performance of antibiotic time outs or reviews
	Timely administration of appropriate antibiotics in cases of suspected sepsis

ACH/CAH/LTCF: Acute care hospital, Critical access hospital, or Long-term care facility



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## CDC's 7 Core Elements

# 5. Tracking (Cont.)

Outcome Measures	Length of stay
	Cure of infection
	Risk-adjusted mortality
	ACH/CAH/LTCF readmissions for select infections
	ACH/CAH/LTCF-onset C. difficile infections
	Adverse drug reactions (number/percentage/rate)
	Antimicrobial resistance- focusing on ACH/CAH/LTCF onset cases would most likely best reflect the impact of ASPs
	Provider-level measures (e.g., treatment of S. aureus & bloodstream infections)
Financial	Antibiotic cost per patient day
	Antibiotic cost per admission
	Total ACH/CAH/LTCF cost per admission

ACH/CAH/LTCF: Acute care hospital, Critical access hospital, or Long-term care facility



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## CDC's 7 Core Elements

# 6. Reporting

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1. Regular reporting information on antimicrobial use & resistance to:
  - Doctors
  - Nurses
  - Relevant staff
2. Promote the use CDC's National Healthcare Safety Network (NHSN) data to guide improvement of antibiotic use
3. Use of the AUR, C.Diff, MDRO modules for NHSN



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CDC's 7 Core Elements

## 7. Education

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**Provide Education On Antimicrobial Resistance**

**& Antimicrobial Stewardship To:**

*(Right Drug, Right Dose, Right Period of Time)*

1. Clinicians
2. Nurses
3. Pertinent staff
4. The public (patients & their families)



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## CDC's 7 Core Elements

# 7. Education (Cont.)

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### Interactive academic detailing

- e.g., face-to-face interactive workshops
  - Has the **strongest evidence** for improving medication prescribing practices
1. One nursing home AS intervention demonstrated:
    - A sustained reduction in antibiotic use for two years after the intervention
    - **By linking education with feedback** on physician prescribing practices
  2. Another study showed a 64% reduction in inappropriate antibiotic use (i.e., prescriptions which did not adhere to guidelines) , over a 12 month period
    - **By providing feedback on:**
      - 1) Individual physician prescribing practices
      - 2) Adherence to the guidelines



**TEXAS**  
Health and Human Services

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# Thank you

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