

Adverse Outcomes & Contact Precautions



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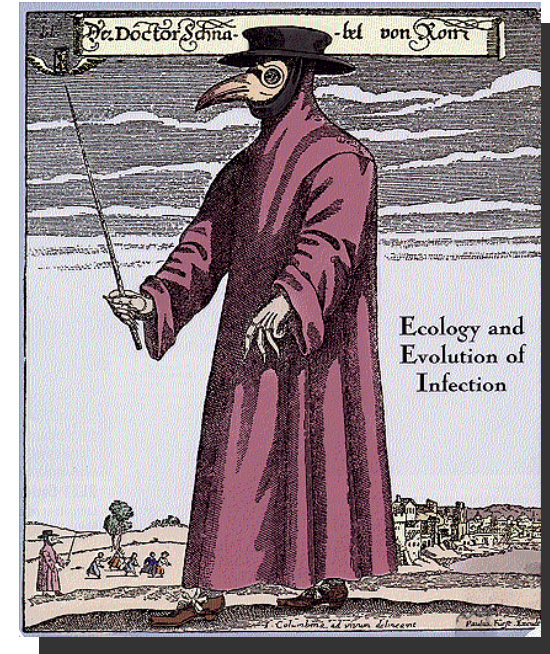
Overview

- History of adverse outcomes of isolation
- How Contact Precautions modify delivery of care
- Impact of Contact Precautions on:
 - Adverse events
 - Psychological outcomes
 - Disease management
 - Patient satisfaction
- Conclusions



Development of Precautions

- 1877 Handbook – Infectious disease hospitals
- 1910 cubicle isolation wards “barrier nursing”
- 1950-60s infectious disease hospitals close
- 1970 CDC: isolation manual specific techniques
- 1983 CDC: emphasized precautions to isolate disease not patients
- 1985 CDC: Universal Precautions
- 1996 CDC: Standard Precautions & Transmission based precautions



HICPAC Isolation Guidelines

Basis for Precautions

- Based on mechanisms of disease transfer
- Lack of definitive evidence for most uses
- Contact Precautions are the most common type of precautions used in the hospital

Contact Precautions

- Use of gowns and gloves for patient contact
 - Private or cohorted room
- “Additional contact precautions” in France



Adverse Outcomes of Isolation in History

- TB Sanitariums & Leper colonies
- Mary Mallon— “Typhoid Mary”
 - Isolated 3 years, released, then isolated remainder of life
- Ted DeVita – aplastic anemia (boy in bubble)
 - “alternatively hostile and angry”



Public Perception

August 30, 2010

Isolation, an Ancient and Lonely Practice, Endures

By ABIGAIL ZUGER, M.D.

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For some of them, though, our shiny, state-of-the-art treatment includes a direct carryover from the Middle Ages.

October 21, 2010

Losing Touch With the Patient

By PAULINE W. CHEN, M.D.

Several years ago I helped care for a man who had been hospitalized with a severe infection of the abdominal wall. When his primary doctors discovered that the bacteria responsible was resistant to most antibiotics, they quickly isolated him, moving him into a single room with a sign on the door proclaiming “Contact Precautions” and directing visitors to put on gloves, mask and gown before entering.

But garbing up in all those items was not a straightforward exercise. The gowns, vast swaths of baby-yellow polyester, added an insulating and sweat-inducing layer. The masks were either so flimsy they fell off easily or so unyielding they muffled voices and steamed up eyeglasses. And the gloves had such generous finger pockets that the excess latex inevitably got tangled in the loops and ties of the gowns and masks or in the dressing materials and bedding of the patient.

None of these precautions made it easy to examine or even visit him. Most of us were loath to go through the process of gearing up more than we had to; and even his wife of more than 20 years occasionally groaned as she dutifully swathed herself in the protective coverings each day. As the weeks wore on, we clinicians found ourselves minimizing our interactions, designating one team member to suit up and complete the work needed or shouting out updates and questions to the patient from the sterile safety of the doorway.

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Contact Precautions and Delivery of Care

	Setting	Design	Effect
Kirkland & Weinstein 1999	Medical ICU	Cohort (219 room entries)	2.1 vs. 4.2 hourly contacts with HCWs (Letter)

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Goldszer et al 2002	Ward awaiting Nursing Home	Cohort	4.3 vs. 10.9 delay days
Stelfox et al 2003	Ward	Matched Cohorts	12 vs. 31 or 6 vs. 8 day stay

Contact Precautions and Delivery of Care

Summary:

- ~50% Fewer HCW Contacts
- Delays in discharges
- Causes appear to be human nature and hospital flow

Caveat:

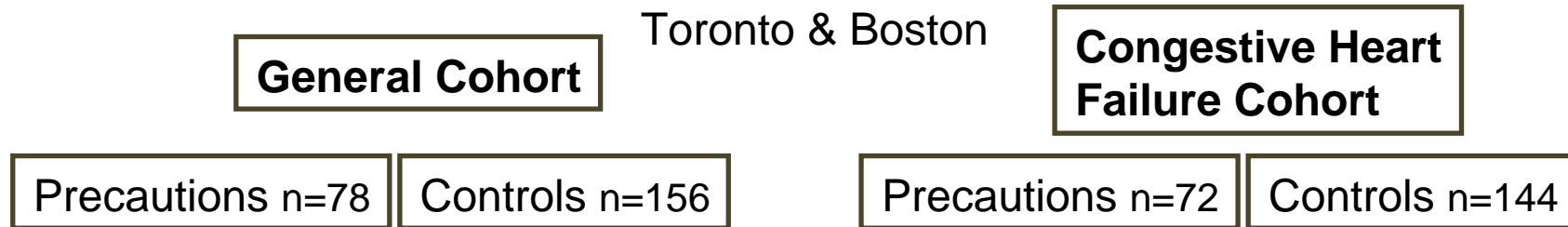
- One pediatric trial did not find a difference with Contact Precautions

Patient Outcomes?

- Adverse events
- Psychological effects
- Impact on disease management
- Patient satisfaction

EFFECT OF CONTACT PRECAUTIONS ON ADVERSE EVENTS

Adverse events and CP



Cases all on CP for MRSA

Controls occupied same private room before/after case

Extensive chart review all subjects

Adverse events and CP

General Cohort

Precautions n=78

Controls n=156

Congestive Heart Failure Cohort

Precautions n=72

Controls n=144

Outcomes:

Length of Stay*	31 vs. 12 days	8 vs. 6 days
any Adverse Event*	17% vs. 7%	47% vs. 25%
Preventable AE*	12% vs. 3%	29% vs. 4%
Death	27% vs. 18%	21% vs. 15%

Adverse events and CP

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Rate Ratio (RR) any AE 2.2

Rate Ratio (RR) preventable AE 7.0

Adverse events and CP

General Cohort

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Congestive Heart
Failure Cohort

Precautions n=72

Controls n=144

Difference in Adverse Events due to:

—falls

— pressure ulcers

— fluid & electrolyte disorders

Rate Ratio (RR) any AE 2.2

Rate Ratio (RR) preventable AE 7.0

Current study to evaluate if Contact Precautions cause adverse events

- 20 hospital ICU study
- Intervention: universal gown and glove
- Control: standard precautions
- Outcome: transmission of MRSA/VRE
- Safety: Frequency of adverse events



**Primary Investigator:
Anthony Harris**

PSYCHOLOGICAL EFFECTS OF CONTACT PRECAUTIONS

Cross-Sectional Studies of Psychological effects

	Setting	Design	
Kennedy & Hamilton 1997	Spinal Cord rehab unit	16 cases/ 16 controls	85% believed CP limited rehab, More Anger 12.3 vs. 16.5 depression scores (NS)
Gammon 1998	Wards, 3 hospitals	20 cases/ 20 controls	30% higher depression and anxiety scores
Tarzi et al 2001	Rehab unit	20 cases/ 20 controls	33% vs. 77% depression 8.6 vs. 15 anxiety scores
Wassenberg et al. 2010	Tertiary Hospital	42 cases/ 84 controls	Small, nonsignificant difference in depression/anxiety at admission
Day et al. 2011	Veterans Hospital	20 cases/ 83 controls	Small, nonsignificant difference in depression/anxiety at admission
Day et al. 2011	Tertiary Hospital	Cohort of 28,564	40% more diagnoses of depression No difference in diagnosis of anxiety

Cross-Sectional Studies of Psychological Effects

	Setting	Design	
Kennedy &	Spinal Cord	16 cases/	85% believed CP limited rehab

All are studies of prevalence....do not show causality

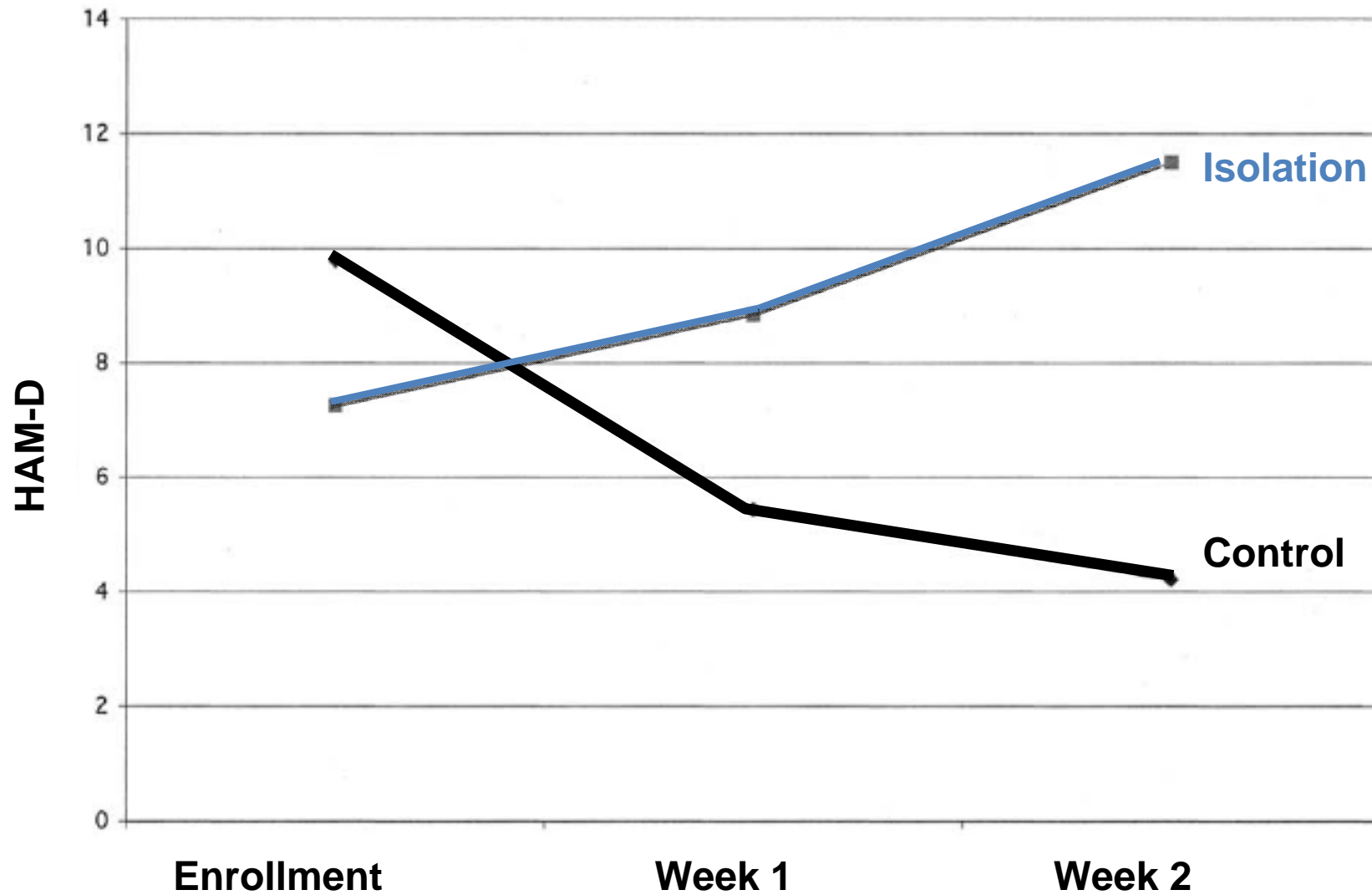
(Contact Precautions = sicker patients)

Farzi et al. 2001	Rehab unit	20 cases/ 20 controls	55% vs. 77% depression 8.6 vs. 15 anxiety scores
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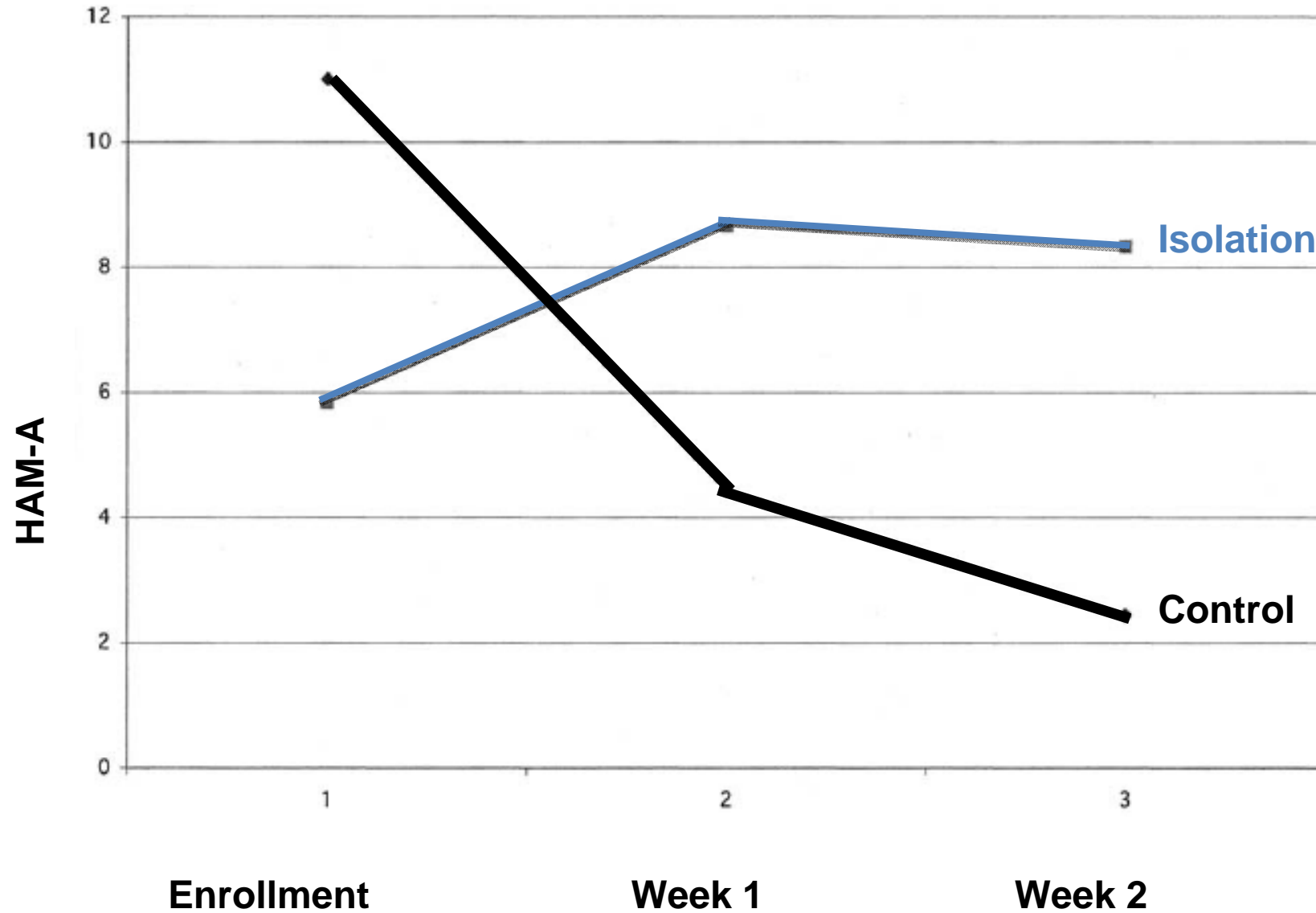
Only published longitudinal study

- Cohort of inpatients enrolled at admission
- Analysis of patients who had follow-up at one week after admission
 - 27 patients on Contact Precautions
 - 24 patients not on Contact Precautions

Depression (Catalano et al 2003)



Anxiety (Catalano et al 2003)



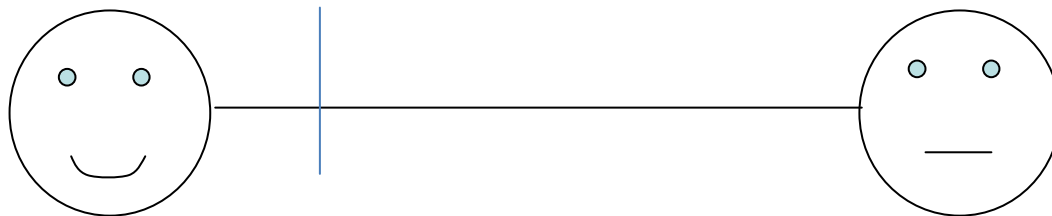
Recent longitudinal study of psychological impact of Contact Precautions

Depression, Anxiety and Emotional States in Contact Precautions

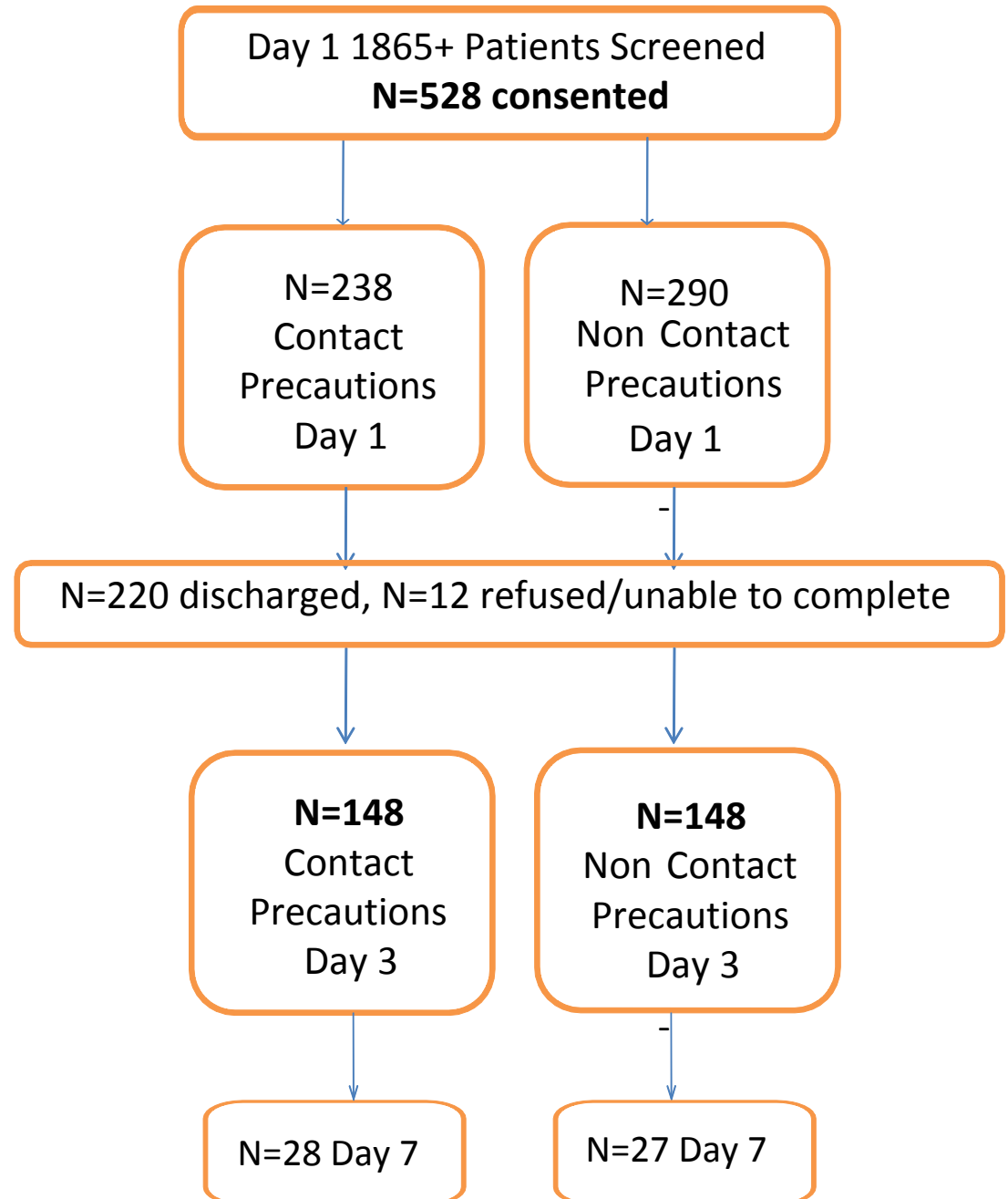
- Prospective Cohort Study
- Enrolled all patients at admission to hospital
- Followed up on day 3 (average length of stay)
- Patients exposed to CP matched to unexposed by hospital ward and month

Measures

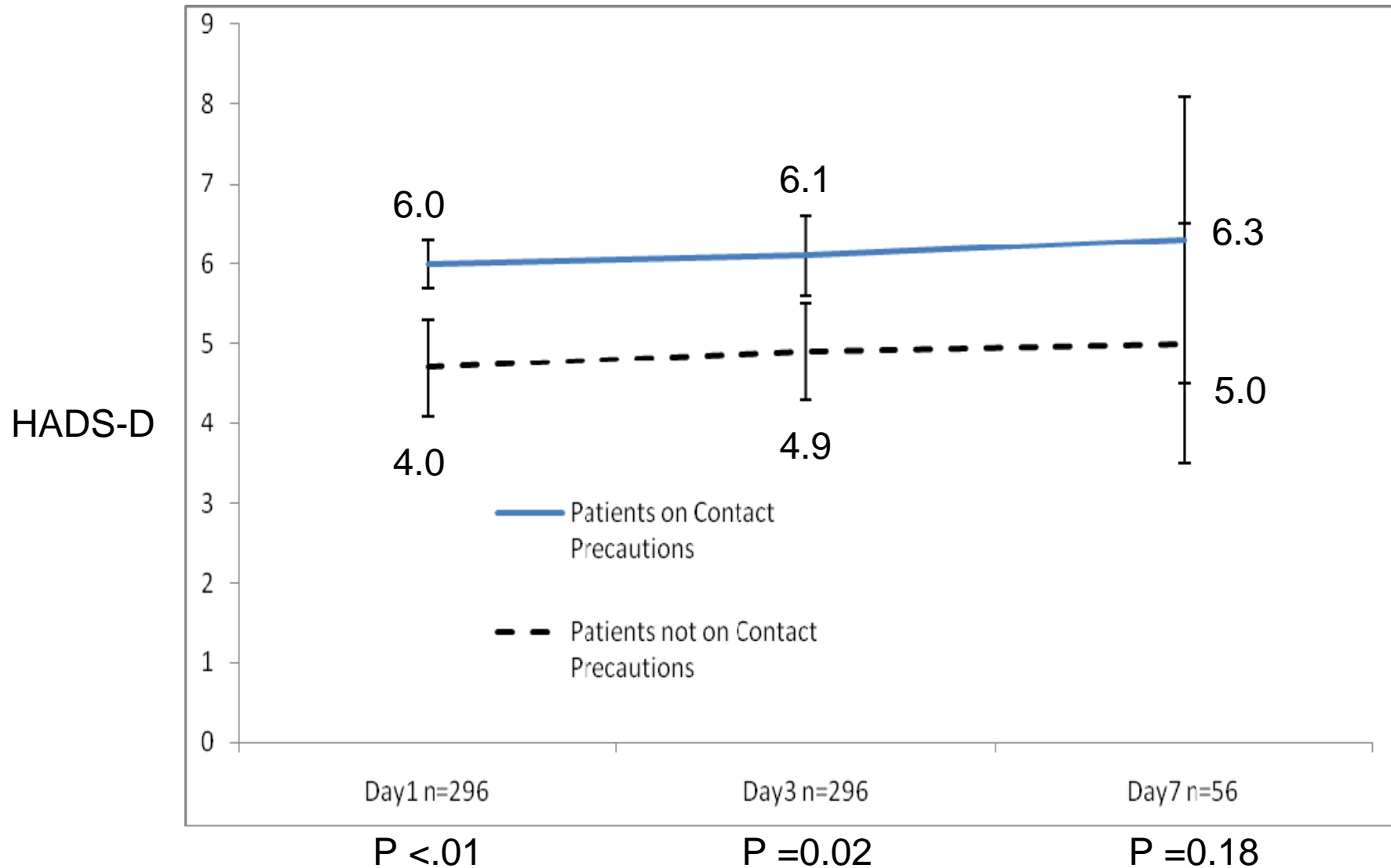
- Hospital Anxiety and Depression Scale (HADS)
 - Sub-scale from 0-21 points
 - Minimum clinically important difference 1.5
- Visual Analog Scales for:
 - Happiness ➤ Confusion ➤ Worry
 - Sadness ➤ Anger



Study Population



Mean HADS depression scores

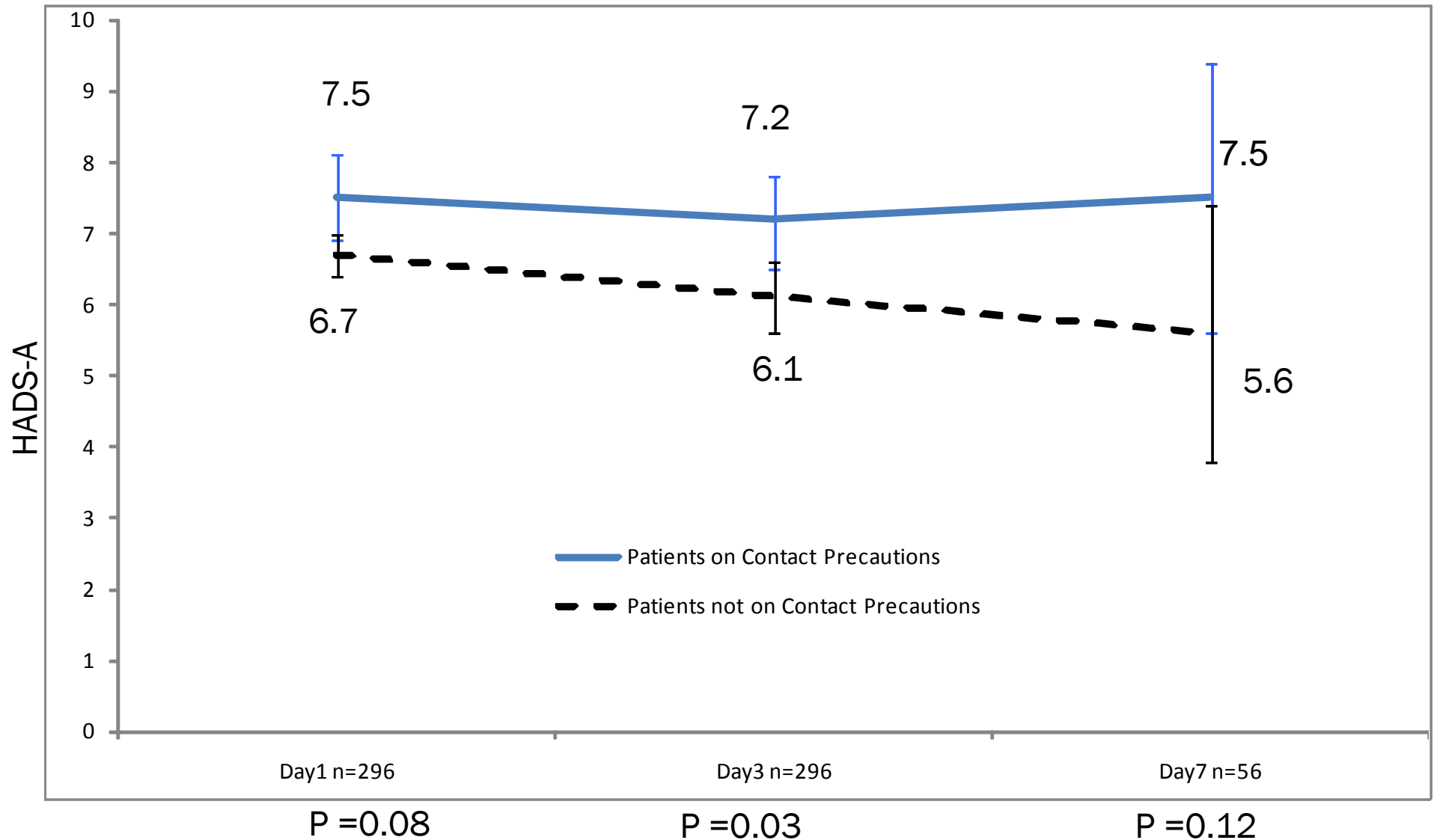


CP not associated with depressive symptoms

	Depression	
	Adjusted Difference (Std Error)	P-value
Contact Precautions	0.50 (0.37)	0.18
Day 1 HADS Depression	0.73 (0.05)	<0.01
<i>Adjusting for sex, age, Education, Charlson comorbidity score, history of depression/schizophrenia/ psychiatric hospitalization</i>		

**Out of 0-21 point
depression scale**

Mean HADS anxiety subscale scores on Day 1, 3 and 7

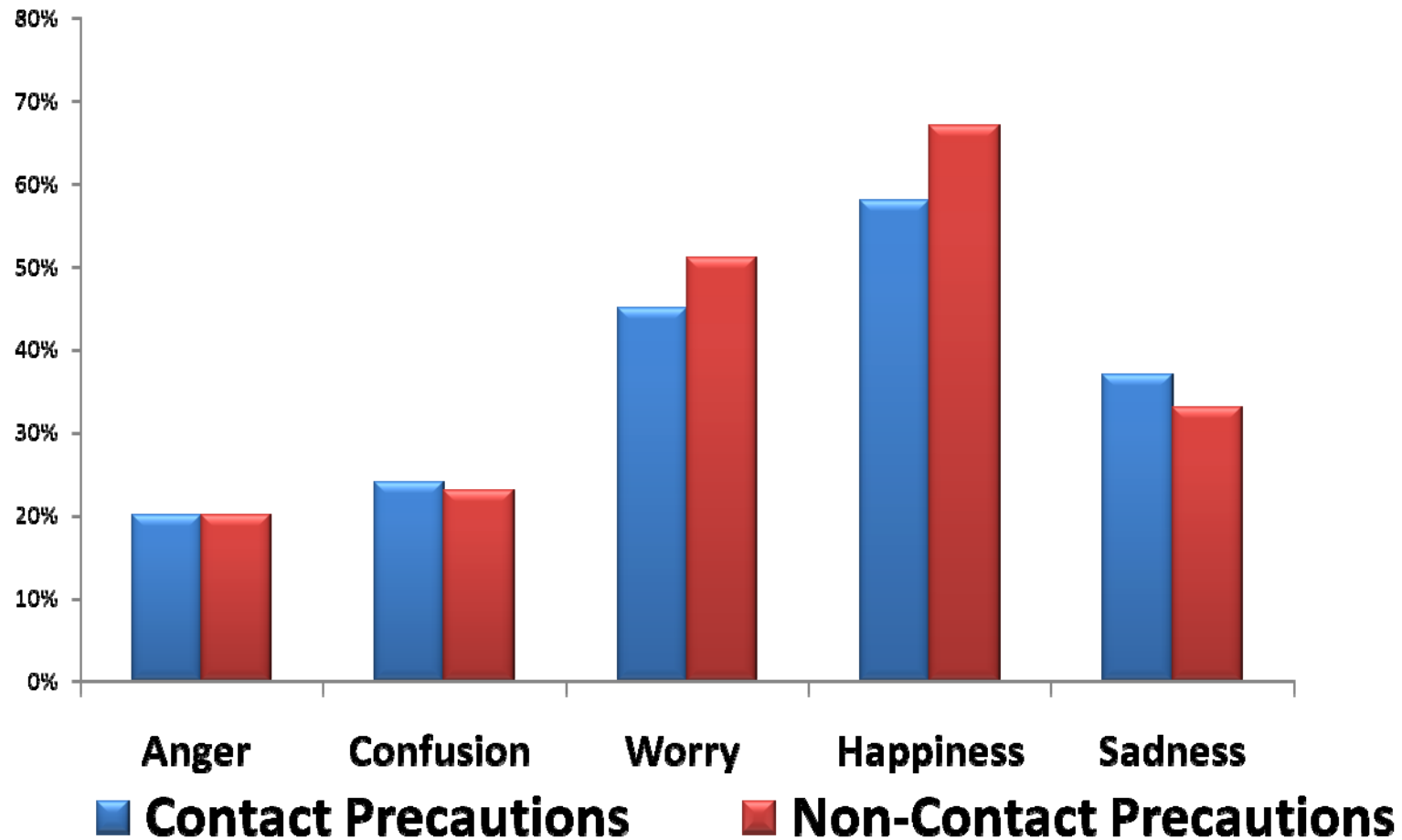


CP not associated symptoms of anxiety

	Anxiety	
	Adjusted Difference (Std Error)	P-value
Contact Precautions	0.42 (0.30)	0.17
Day 1 HADS Anxiety score	2.34 (0.33)	<0.01
<i>Adjusting for sex, age, Charlson Comorbidity Index and history of anxiety/psychiatric admission</i>		

**Out of 0-21 point
anxiety scale**

Emotional States on Day 3



Summary of Psychological effects of Contact Precautions

- Patients on Contact Precautions tend to have more depression and anxiety
- Exposure to Contact Precautions does not appear to cause more depression, anxiety or emotional changes

PROCESS MEASURES AND CONTACT PRECAUTIONS

Process Measures and CP

One historical cohort found worse congestive heart failure process measures



Congestive Heart Failure Process Measures:	
Stress Test or Angiogram	14% vs. 45%*
Echocardiogram (LVEF)	57% vs. 69%*
Discharge Education	29% vs. 51%*
Follow up appointment	24% vs. 46%*
Discharge Medications	Less likely to receive

Pneumonia Process of Care Measures

Pneumonia is a serious lung infection that causes difficulty breathing, fever, cough and fatigue. These measures show some of the recommended treatments for pneumonia. [Read more information about pneumonia care.](#) [Learn why Pneumonia Process of Care Measures are Important.](#)

[View Graphs](#) »

[View Tables](#) »

	THE JOHNS HOPKINS HOSPITAL 600 NORTH WOLFE STREET BALTIMORE, MD 21287 (410) 955-9540 Acute Care 2.1 miles Map & Directions 	UNIVERSITY OF MARYLAND MEDICAL CENTER 22 S GREENE ST BALTIMORE, MD 21201 (410) 328-0313 Acute Care 0.7 miles Map & Directions 
Pneumonia Patients Assessed and Given Pneumococcal Vaccination	79% ²	87%
Pneumonia Patients Whose Initial Emergency Room Blood Culture Was Performed Prior To The Administration Of The First Hospital Dose Of Antibiotics	99% ²	83%

(www.hospitalcompare.hhs.gov)

CP and Standard Process Measures

Study Aim:

Examine the association between Contact

Precautions and process-of-care quality measures

- retrospective diagnosis based cohorts of inpatients
 - Acute Myocardial Infarction
 - Congestive Heart Failure
 - Pneumonia
 - Surgical Care Improvement Project
- Adjusting for comorbidities and severity of illness

Are Process Measures affected by Contact Precautions?

- 7463 Admissions reviewed
- No effect:
 - Acute Myocardial Infarction
 - Congestive Heart Failure
 - Surgical Care Improvement Project (SCIP)
- Possible:
 - Pneumonia 79% vs. 93% ($p < 0.01$)

PATIENT SATISFACTION AND CONTACT PRECAUTIONS

Patient Satisfaction and Contact Precautions

- Formal complaints 8% vs. 1%
- Informal complaints 25% vs. 3%
(Stelfox et al. 2003)
- Patients perceived less HCW interaction, but rated care as better (Evans et al. 2003)
- Survey of 43 cases/controls using HCAHPS
 - no difference in satisfaction (less likely to recommend hospital, less well informed)
(Gasink 2008)

Patient Outcomes?

- Adverse events
- Psychological effects
- Impact on disease management
- Patient satisfaction

Patient Outcomes?

- Adverse events
 - Possibly more falls, pressure ulcers and electrolyte disorders
- Psychological effects
- Impact on disease management
- Patient satisfaction

Patient Outcomes?

- Adverse events
- Psychological effects
 - More at baseline
 - CP does not increase depression or anxiety
- Impact on disease management
- Patient satisfaction

Patient Outcomes?

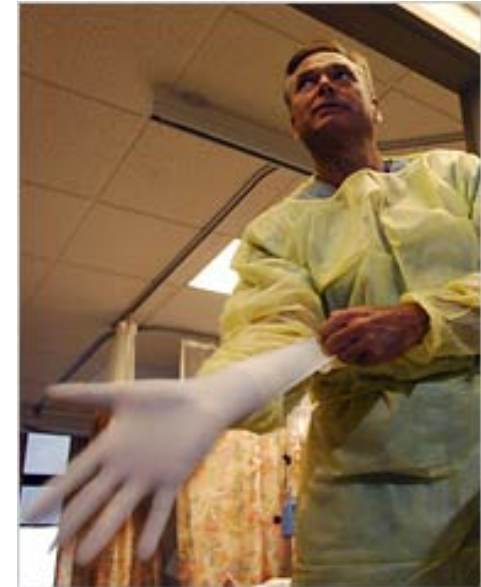
- Adverse events
- Psychological effects
- Impact on disease management
 - Possible small effect on Pneumonia
- Patient satisfaction

Patient Outcomes?

- Adverse events
- Psychological effects
- Impact on disease management
- Patient satisfaction
 - Probably no impact

Conclusions—Contact Precautions

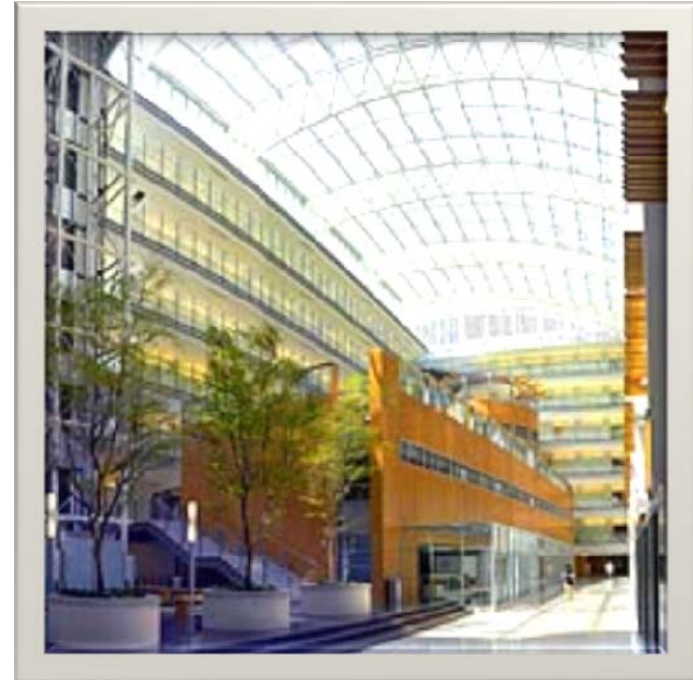
- Applied to sicker patients
- At baseline these patients have worse outcomes
- May increase adverse events
- Unlikely to impact:
 - Depression or Anxiety
 - Disease Management or Patient Satisfaction



Adapt CP to your local institutional needs

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- Mary-Claire Roghmann, MD MS
- Anthony D. Harris, MD MPH
- Eli N. Perencevich, MD MS



Further reading

- Kirkland KB. Taking off the gloves: Toward a less dogmatic approach to the use of Contact Isolation. Clin Infect Dis. 2009;48:766-71.
- Morgan DJ, Diekema DJ, Sepkowitz K, Perencevich EN. Adverse outcomes associated with contact precautions: A review of the literature. AJIC 2009;37:85-93.
- Controversies in Hospital Infection Prevention blog (<http://haicontroversies.blogspot.com>) – Mike Edmond

Dan Diekema
Eli Perencevich

