

The State of Support Surface Integrity in Acute Healthcare Facilities

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INTRODUCTION

- Support surfaces where patients lay are a common feature across healthcare facilities, yet the integrity of these surfaces is rarely monitored or inspected.¹

OBJECTIVE

- To report the results of an ongoing program to assess support surfaces in acute healthcare facilities.

METHODS

- Assessments of support surfaces were conducted with the permission and cooperation of the healthcare facility.
- After recording demographic information, sheets were removed or rolled back for inspection.
- Each surface was assessed for specific failure modes: holes or tears, poor response (rebound or exuding liquid) when compressed, stains, internal damages, thinning areas, and torn zippers.
- A surface was scored as RED (replace immediately), YELLOW (reassess in six months) or GREEN (suitable for continued use) based on the number and types of failure modes assigned to it.

For presentation NPIAP 2023, March 17-19
San Diego, California

DATA/RESULTS

	# of Facilities	# of Surfaces	Ave. age ± Standard Dev.	Primary failure (%)	Secondary failure (%)	Ave. age of RED surfaces	Ave. age of YELLOW surfaces	Ave. age of GREEN surfaces
Acute Care	85	5121	5.19 ± 4.13	Holes or tears (65.67%)	Poor response to compression (23.67%)	7.26	4.38	2.59

Table 1. Frequency and Percent of Surface Types

Category	Frequency	Percent (%)
Foam	3783	73.87
Self-adjusting	686	13.4
Integrated	305	5.96
Gel	277	5.41
Low Air Loss	32	0.62
Alternating Pressure	29	0.57
Other	4	0.08
Invalid	3	0.06
Foam Powered	1	0.02
Inner Spring	1	0.02

Table 2. Frequency and Percent of Tag Color

Tag Color	Frequency	Percent (%)
RED	3023	59.03
YELLOW	87	1.7
GREEN	1641	32.04
INVALID*	370	7.23
*Including both unidentified tags and missing values		

Table 3. Frequency and Percent of Red Failure Category

Failure Category	Frequency	Percent (%)
Single	1238	40.95
Double	1003	33.18
Triple or more	782	25.87

Table 4. Frequency and Percent of Single Failure Mode by Tag Color

Tag Color	Single Failure Mode	Frequency	% of single failures
Red	Holes/Tears	813	65.67
	Compressed	293	23.67
	Stained	56	4.52
	Internal damages	44	3.55
	Thinning	28	2.26
	Torn zippers	4	0.32
Yellow	Stained	76	87.36
	Compressed	6	6.90
	Holes/Tears	5	5.75

Table 5. Frequency of Red Tags with Double Failure Modes

	Internal damages	Compressed	Thinning areas	Stained	Torn Zippers
Internal damages					
Compressed	93				
Thinning areas	5	182			
Stained	7	63	61		
Torn Zippers	1	0	1	0	
Holes, tears, fraying	36	332	125	89	8

Table 6. Frequency of Support Surfaces Types by Mattress Condition

Tag Color	Category									
	Foam	Self-adjusting	Integrated	Gel	Low Air Loss	Alternating Pressure	Foam Powered	Inner Spring	Other	Total
Green	1257	147	123	73	21	17	0	0	3	1641
Yellow	56	8	0	21	1	0	0	0	1	87
Red	2210	470	165	156	10	10	1	1	0	3023

Figure 1: Ages of Surfaces by Inspection Tag

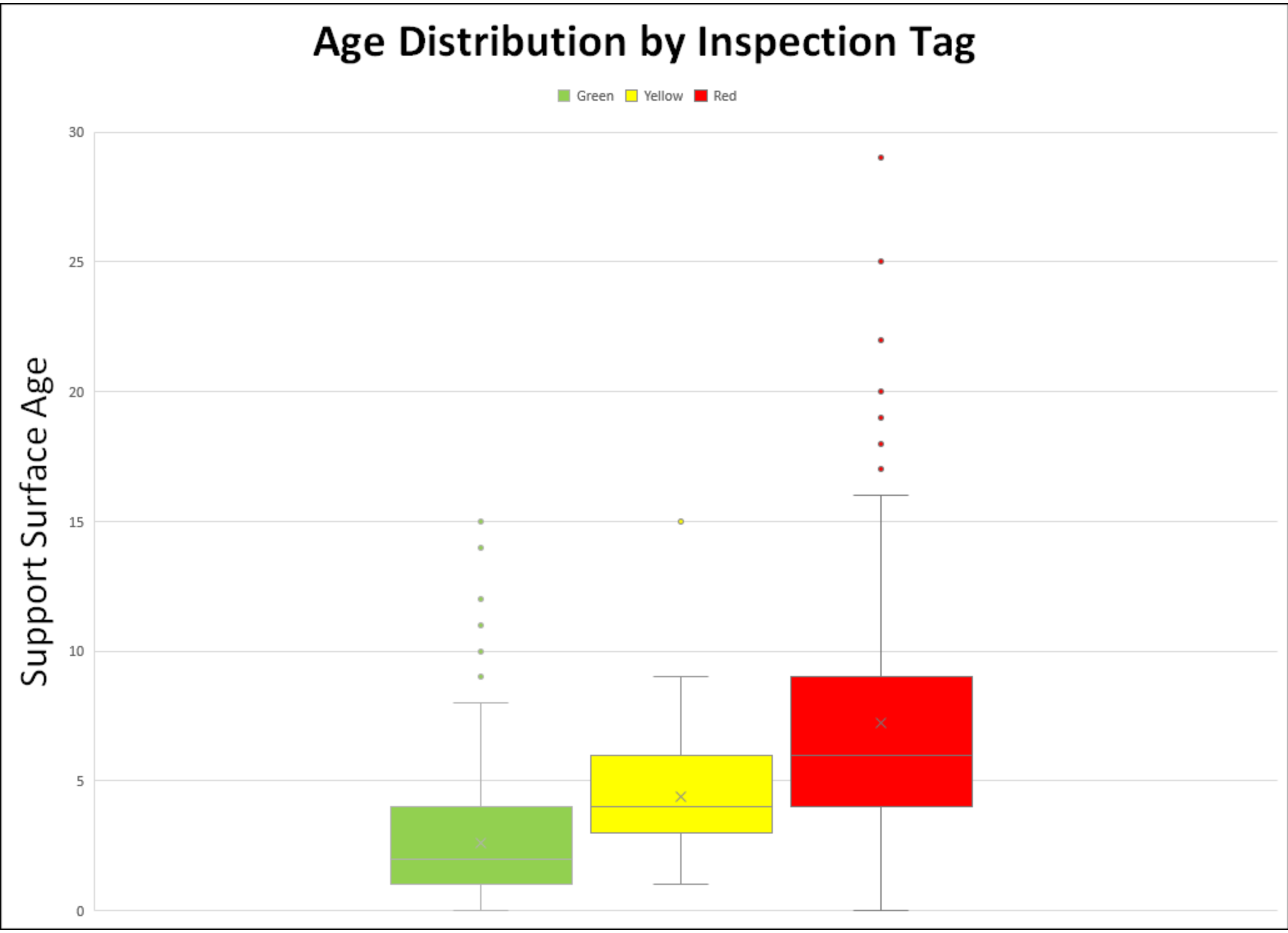


Figure 2: Distribution of Support Surface Scoring

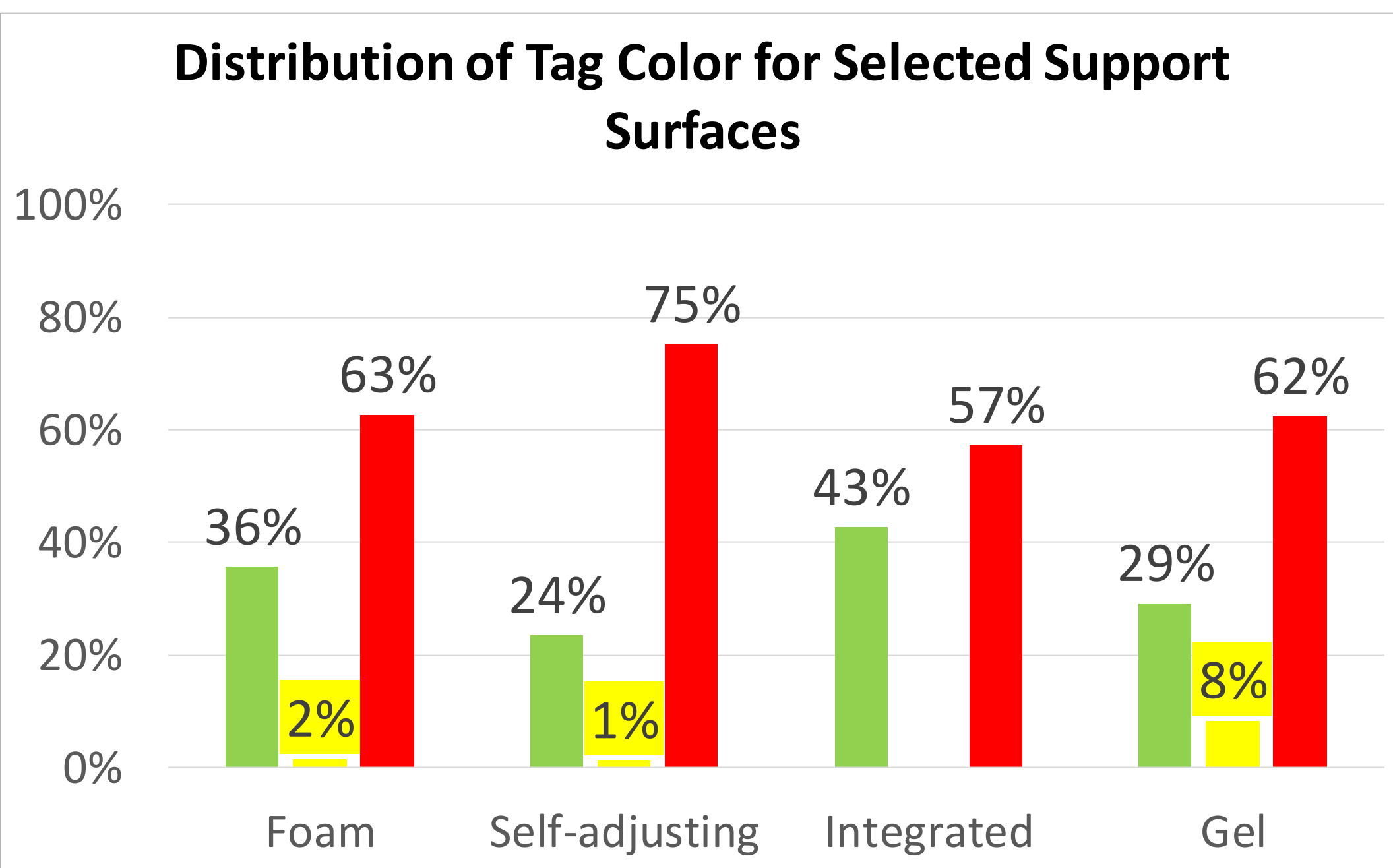
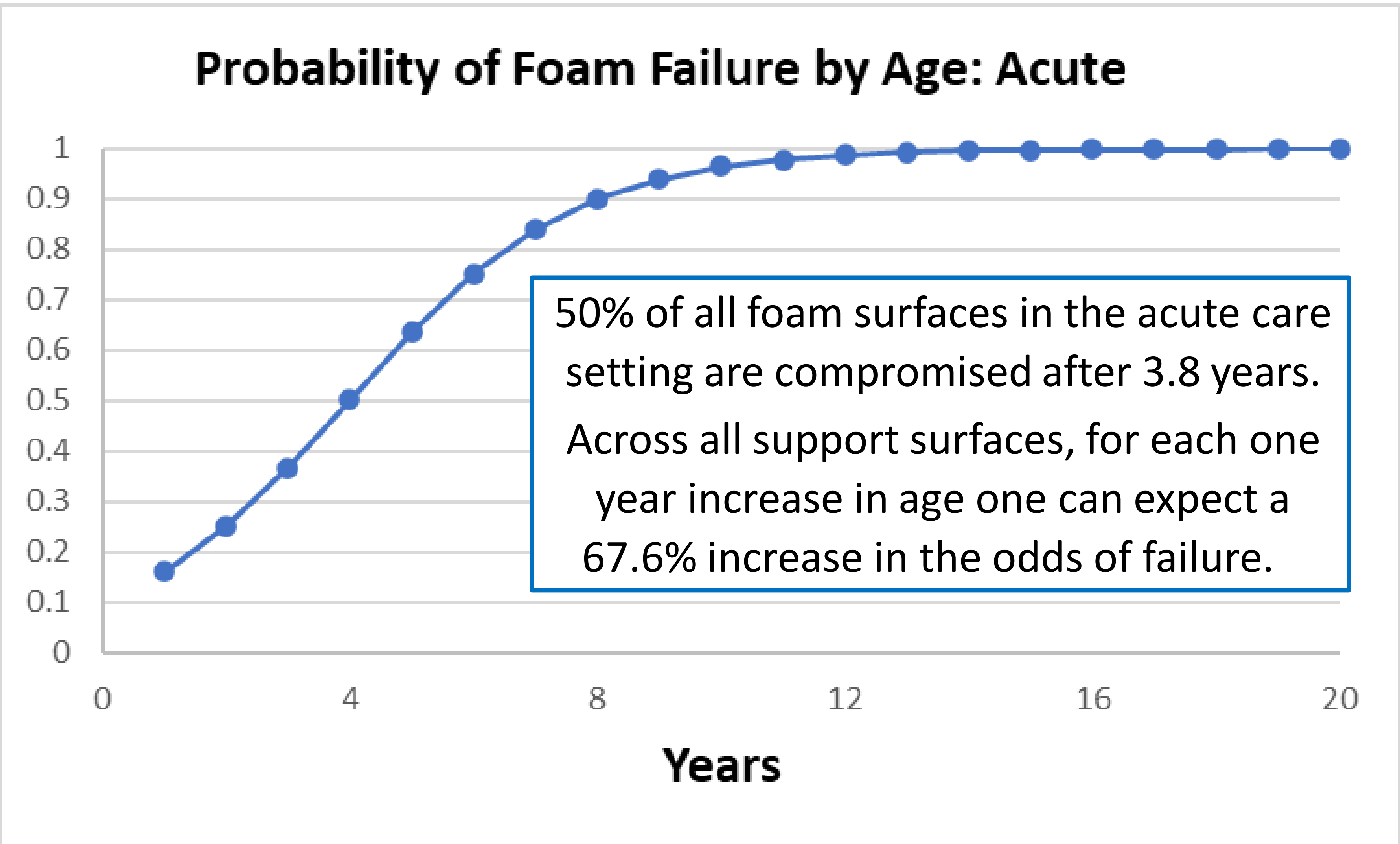


Figure 3: Probability of Foam Surface Failure by Age



CONCLUSIONS

- Most support surfaces analyzed in the study are unsuitable for patient care.
- 50% of surfaces in the healthcare setting are compromised within 3.8 years, making frequent assessments critical for best patient care.
- Most surfaces that received a yellow tag for a single failure mode were identified as stained (see Table 4). Staining may be a leading indicator for support surface failure.
- Published studies and our results indicate that the contribution of support surfaces to patient complications such as pressure injuries and infection transmission warrants further investigation.^{2,3,4}

REFERENCES

- Marks B. (2016) Uncovering the Prevalence of Damaged Mattresses. *Explore* Spring; 17-18.
- Bradbury SL, Mack D, Crofts T, Ellison RT 3rd. (2014) Potential bloodborne pathogen exposure from occult mattress damage. *Am J Infect Control.* Apr;42(4):421-2.
- Gillespie BM, Chaboyer WP, McInnes E, Kent B, Whitty JA, Thalib L. (2014) Repositioning for pressure ulcer prevention in adults. *Cochrane Database Syst Rev.* Apr 3(4):CD009958.
- McInnes E, Jammali-Blasi A, Cullum N, Bell-Syer S, Dumville J. (2012) Support Surfaces for Treating Pressure Injury: A Cochrane Systematic Review. *Int J Nurs Stud.* Mar; 50(3):419-30.

Financial support was provided by



The State of Support Surface Integrity in Post-Acute Healthcare Facilities

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INTRODUCTION

- The surfaces where patients lay are a common care feature across healthcare facilities, but the integrity of these surfaces is rarely inspected.¹

OBJECTIVE

- To report the results of an ongoing program to assess support surfaces in post-acute healthcare facilities.

METHODS

- Assessments of support surfaces were conducted with the permission and cooperation of the healthcare facility.
- After recording demographic information, sheets were removed or rolled back for inspection.
- Each surface was assessed for specific failure modes: holes or tears, poor response (rebound or exuding liquid) when compressed, stains, internal damages, thinning areas, and torn zippers.
- A surface was scored as RED (replace immediately), YELLOW (reassess in six months) or GREEN (suitable for continued use) based on the number and types of failure modes assigned to it.

Nursing Home Foam Surface Data Results

	# of Accounts	# of Surfaces	Ave. age ± Standard Dev.	Primary failure (%)	Secondary failure (%)	Ave. age of RED surfaces	Ave. age of YELLOW surfaces	Ave. age of GREEN surfaces
Nursing Home Foams	485	33360	7.13 ± 3.68	Compressed (65.69%)	Holes, Tears, and Fraying (23.42%)	8.75	4.28	3.26

Table 1. Frequency and Percent of Customer Types

Description	# of Accounts	Percent (%)
Nursing Home	485	92.9
Assisted Living Ctr	16	3.07
Rehab Hospital/LTAC	9	1.73
Hospital	3	0.58
Behavioral Health	2	0.38
Home Health Agency	2	0.38
Physician Office	2	0.38
Other	3	0.48

Table 2. Frequency and Percent of Surface Types

Category	Frequency	Percent (%)
Foam	33360	92.14
Low Air Loss	1142	3.15
Foam Powered	531	1.47
Inner Spring	271	0.75
Alternating Pressure	233	0.64
Other	171	0.47
Self-adjusting	148	0.41
Gel	37	0.1
Invalid	314	0.87

Table 3. Frequency and Percent of Tag Color for Foam Surfaces in Nursing Homes

Tag Color	Frequency	Percent (%)
RED	16774	52.83
YELLOW	279	0.87
GREEN	11042	34.78
INVALID*	3651	11.50
*Including both unidentified tags and missing values		

Table 4. Frequency and Percent of Red Failures for Foam Surfaces in Nursing Homes

Failure Category	Frequency	Percent (%)
Single	7634	24.09
Double	5319	16.73
Triple or more	3821	12.01

Table 5. Frequency and Percent of Single Failure Modes for Foam Surfaces in Nursing Homes

Tag Color	Single Failure Mode	Frequency	% of single failures
Red	Compressed	5015	65.69
	Holes/Tears	1788	23.42
	Stained	424	5.55
	Thinning areas	313	4.10
	Internal damages	76	0.99
	Torn zippers	18	0.23
Yellow	Stained	257	93.45
	Compressed	14	5.09
	Thinning areas	4	1.45

Table 6. Frequency of Red Tags with Double Failure Modes for Foam Surfaces in Nursing Homes

	Internal damages	Compressed	Thinning areas	Stained	Torn Zippers
Internal damages					
Compressed	387				
Thinning areas	45	1211			
Stained	48	751	309		
Torn Zippers	2	32	9	16	
Holes, tears, fraying	45	1701	378	319	66

Figure 1: Ages of Surfaces by Inspection Tag for Foam Surfaces in Nursing Homes

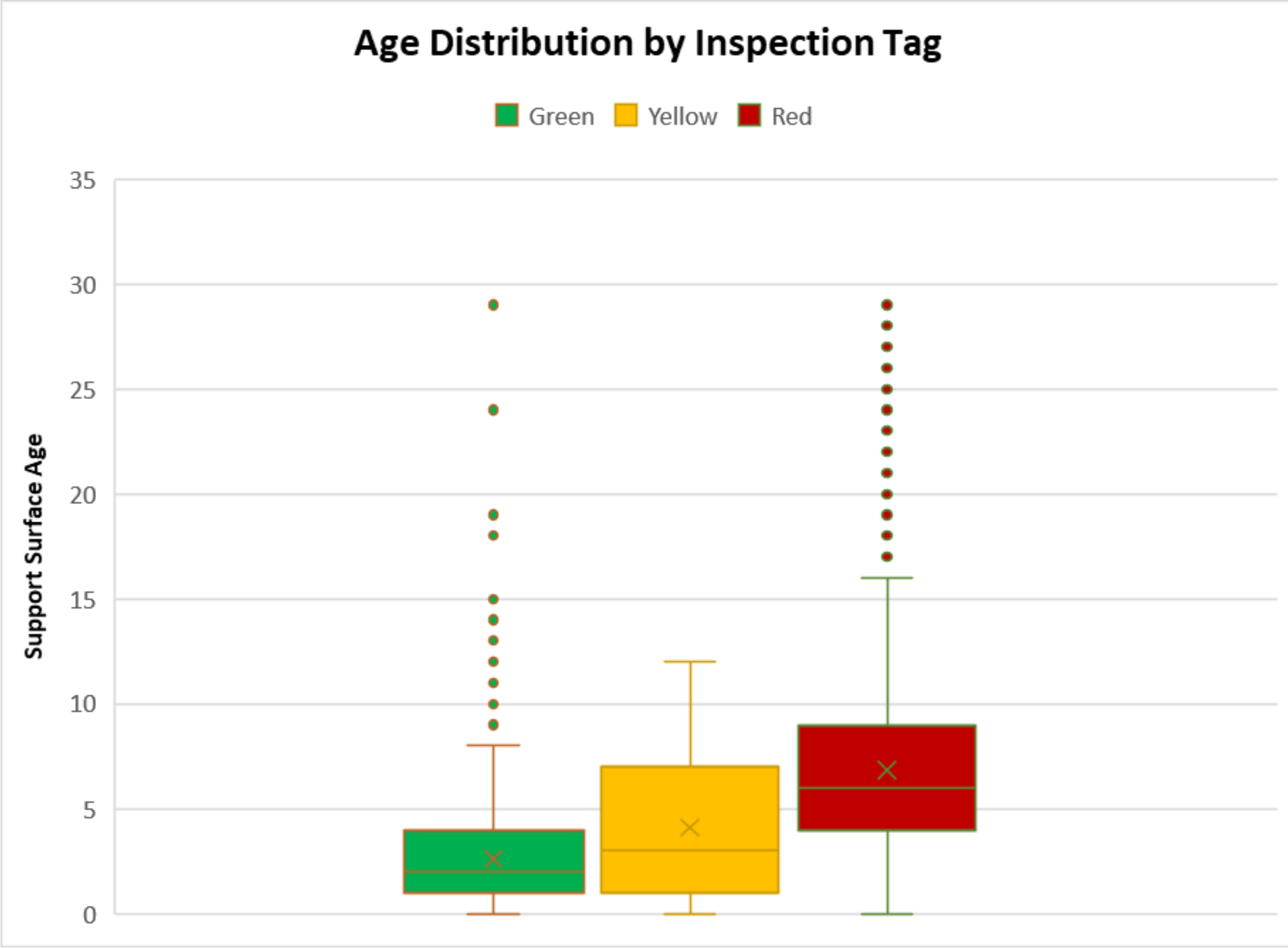
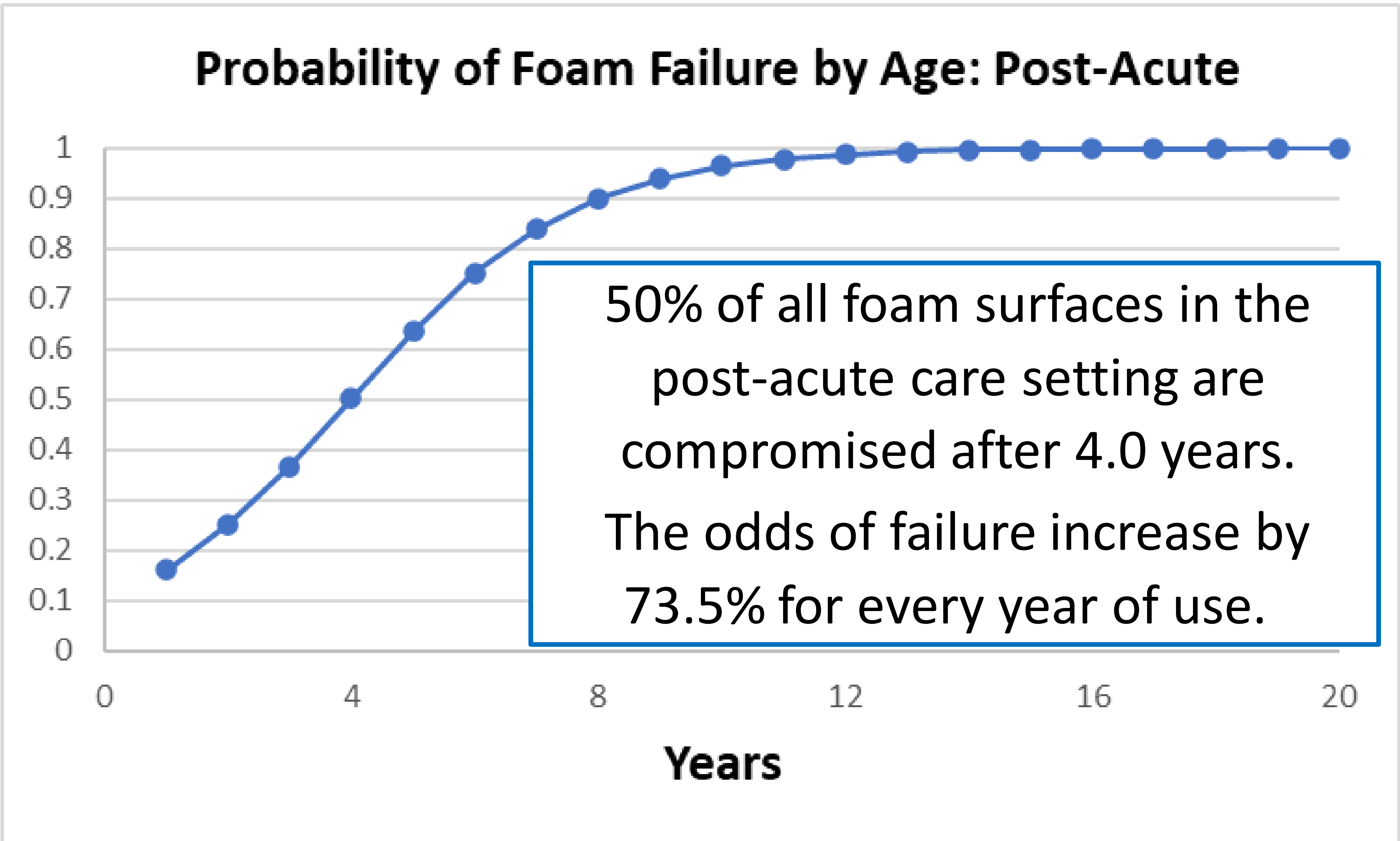


Figure 2: Probability of Foam Surface Failure by Age for Foam Surfaces in Nursing Homes



CONCLUSIONS

- Most support surfaces analyzed in the study are unsuitable for patient care.
- 50% of surfaces in the healthcare setting are compromised within 4.0 years, making frequent assessments critical for best patient care.
- Most surfaces that received a yellow tag for a single failure mode were identified as stained (see Table 5). Staining may be a leading indicator for support surface failure.
- Published studies and our results indicate that the contribution of support surfaces to patient complications such as pressure injuries and infection transmission warrants further investigation.^{2,3,4}

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