How to decrease HAI costs by 30% with two easy steps

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Executive Summary

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Current healthcare operational landscape

- Impact of reduced operating margins
- Emphasis on P4P reimbursement system
- Current quality efforts and gaps

Impact of indoor environment

- Pathogen transmission
- Pathogen infectivity
- Patient defenses

Barriers to indoor air management

- Misconceptions about mold and allergies
- Operations and Maintenance
- Effect on costs associated with building energy use

Necessary actions

- Key steps for hospital leadership
- Important considerations during implementation
- Potential benefits in financial performance

Despite excess costs, HAIs are alarmingly common and create significant financial burden

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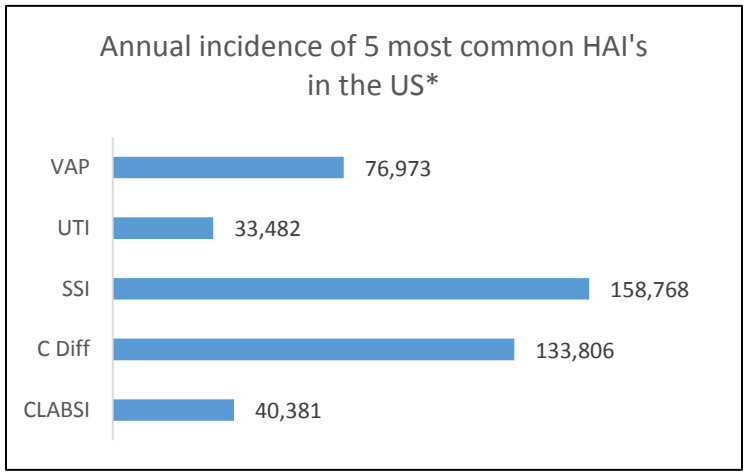
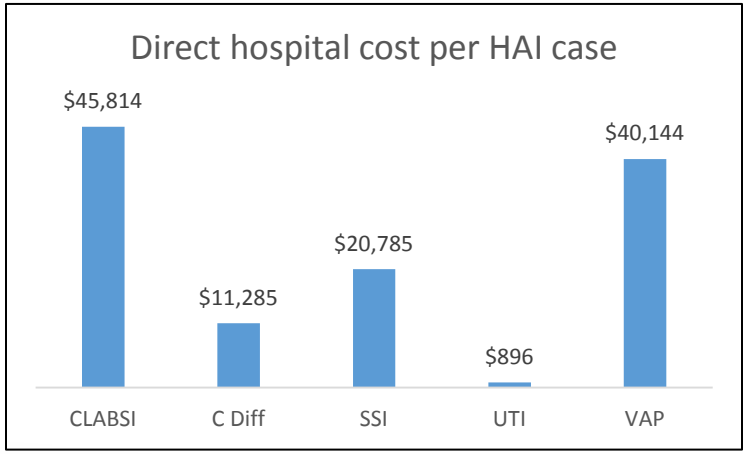
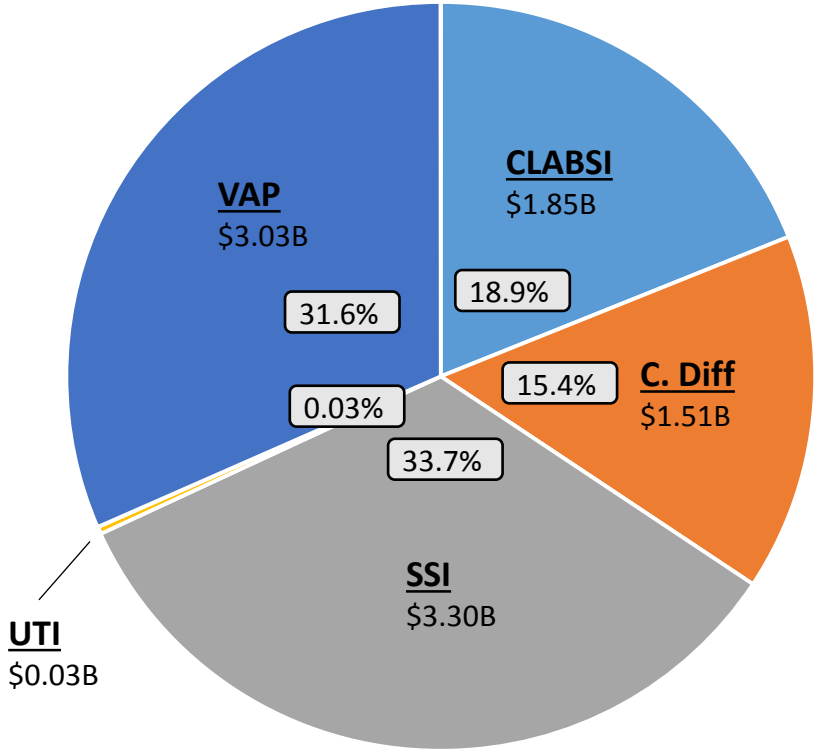




*2013 annual volume

Total annual HAI cost: $9.8B



Zimlichman E, Henderson D, Tamir O, et al. HAIs: A Meta-analysis of Costs and Financial Impact on the US Health Care System. JAMA Intern Med. 2013;173(22):2039-2046. doi:10.1001/jamainternmed.2013.9763.

To better understand transmission, a 13 month study on indoor air quality, bacterial spread & patient HAIs was performed

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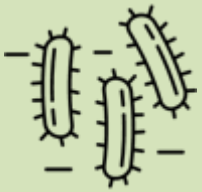
Monitor indoor conditions in 10 patient rooms and 2 nurse stations



Map bacterial communities in these spaces

Track patient HAIs

Colonization and Succession of Hospital-Associated Microbiota. In Press, Sept 2016
Simon Lax, et.al. U.Chicago, IL 60637

Indoor air RH was found to be the most significant factor associated with patient HAIs

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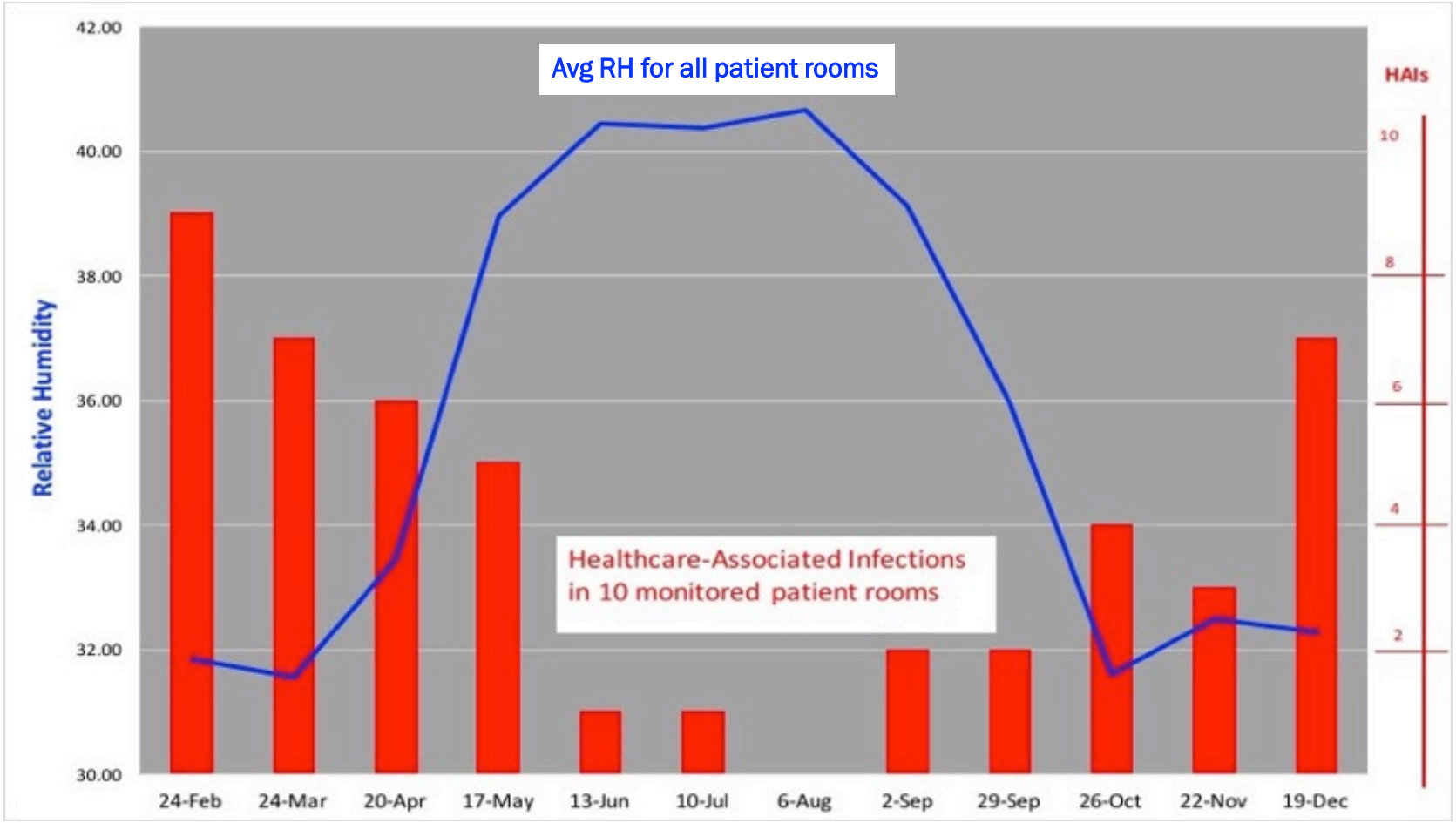

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Dry indoor air shrinks aerosolized droplets, promoting pathogen transmission

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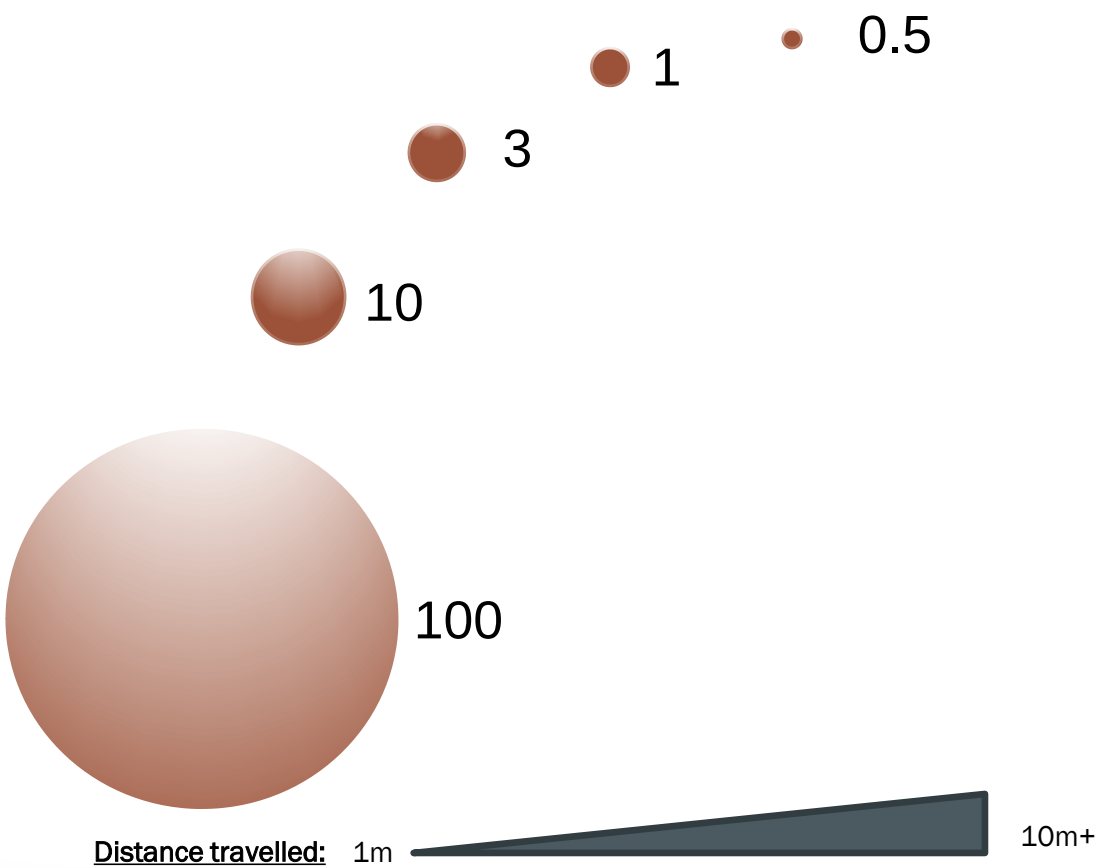

Scofield - Sterling diagram published in 1985, with optimal RH level for health of 40%–60%

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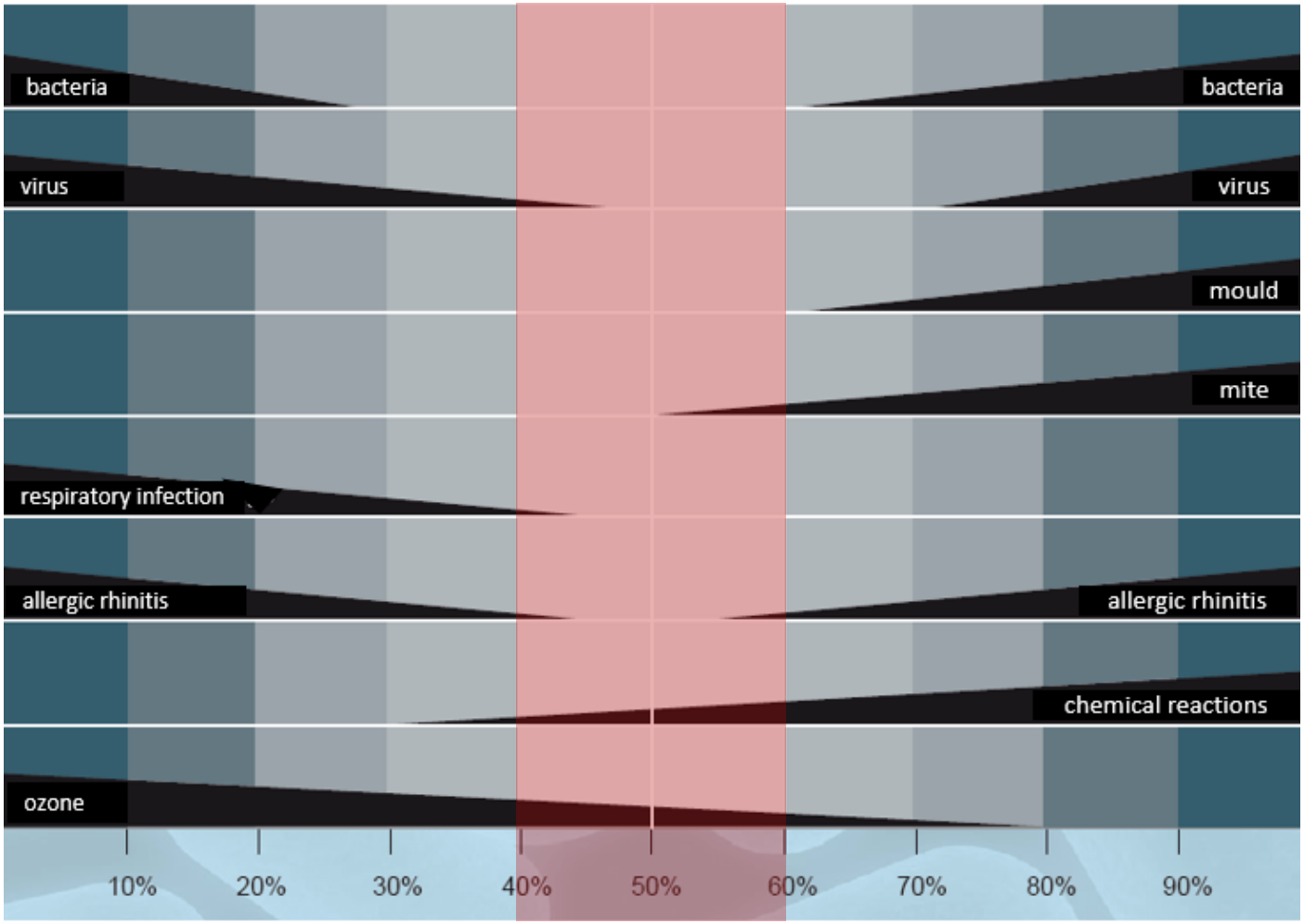

Viability of many pathogens is reduced in air with RH 40%–60%

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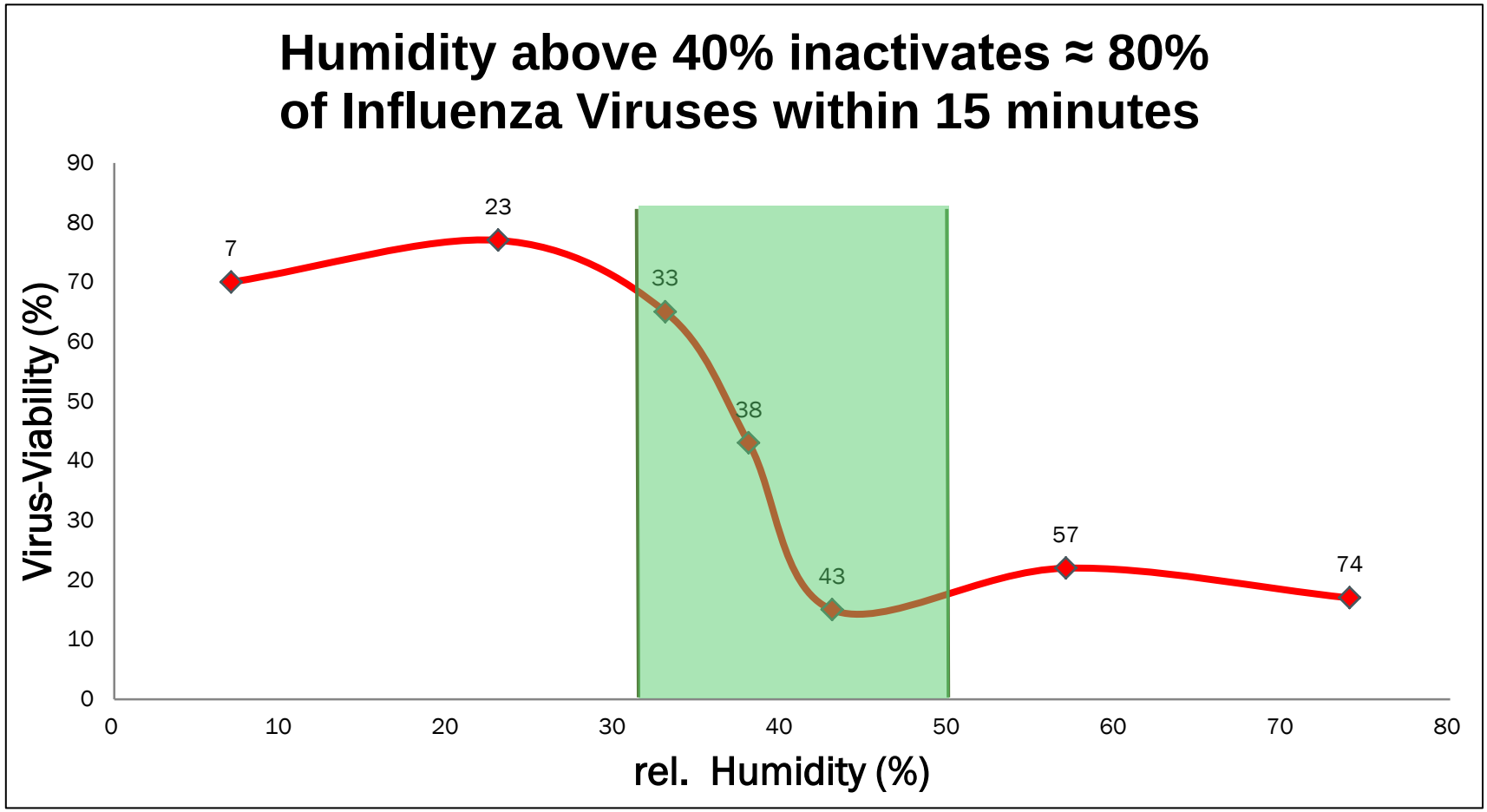

High Humidity Leads to Loss of Infectious Virus from Simulated Coughs. U. Illinois, 2013
J Noti, et al.

Projected financial impact of room air humidification for a 250-bed hospital

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Cost-reduction analysis if healthcare-associated infections were decreased by 20%

		Q1	Q2	Q3	Q4
BENEFITS - Year One		Dollars			
Increased Revenue	Maximize per day bed value by decreasing LOS	1,310,126	1,310,126	1,310,126	1,310,126
	Decrease non-reimbursable HAI costs	764,890	764,890	764,890	764,890
Cost Avoidance	3% CMS penalty for HAI readmissions	91,787	91,787	91,787	91,787
	CMS Quality Index penalty	TBD			
	JCA citations and hospital closure	TBD			
	Employee absenteeism	TBD			
	Quarterly total	2,166,803	2,166,803	2,166,803	2,166,803
	Cumulative value	2,166,803	4,333,606	6,500,409	8,667,212
INVESTMENTS					
	Gas				
	Installation & Integration of New System	(1,198,500)			
	Maintenance	(23,850)	(23,850)	(23,850)	(23,850)
	Operating Cost	(34,573)	(34,573)	(34,573)	(34,573)
	OR & PT Room Down Time	(10,000.00)	-	-	-
	Quarterly total	(1,266,923)	(58,423)	(58,423)	(58,423)
	Cumulative investment	(1,266,923)	(1,325,347)	(1,383,770)	(1,442,194)
NET VALUE					
	Quarterly total	$ 899,880	$ 2,108,380	$ 2,108,380	$ 2,108,380
	Cumulative total	$ 899,880	$ 3,008,259	$ 5,116,639	$ 7,225,018
	1st year net return	*$7,225,018*			
	Breakeven point	*1st Quarter*			
	ROI (1st year)	*500.97%*			

Next steps for healthy humidification in your hospital

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1. **Record HAIs**
   - Accurately monitor patient adverse events, especially HAIs
2. **Monitor indoor air quality throughout the facility**
   - A key starting point is understanding existing indoor RH and how it varies throughout the hospital
3. **Identify weaknesses in building envelope and HVAC systems**
   - Look for areas which can be improved
   - Consult healthcare humidification experts
4. **Install appropriate humidification systems**
   - Energy efficient
   - Hygienic
5. **Continue monitoring both indoor air RH and patient outcomes**
   - Assess impact of proper indoor air hydration on patient outcomes and length of stay
   - Perform ROI analysis