## Deep Dive into ROI for Safe Patient Handling

Edward Hall Simon Mawer





The ASPHP is a non-profit organization established to improve the safety of caregivers and their patients by advancing the science and practice of safe patient handling and mobility.

Anyone interested in the practice and profession of safe patient handling and mobility, regardless of level of education, profession or position, may join.

- Become a member.

Network. Gain additional knowledge and educational credits. Enjoy extra benefits.

- Find your fit.

Help shape the future of SPHM – serve on a committee.

- Become Certified.

Attain recognition. Acquire the education and skills needed to make SPHM programs successful. Certification Options: Associate, Clinician, Professional

Lead us.

Serve on our Board. Become an officer.

## Learning Objectives

- Understand Value Drivers of Safe Patient Handling and Movement Programs
- Learn how to use Excel ROI tool can be used to Calculate ROI and Net Present Value of Programs
- Learn how to read Tornado, Waterfall diagrams and what they tell you about program value.



## Questions for our audience

- Do you have access to data at your organization about claims cost?
- Are you planning are asking for funds in the next year for safe patient handing equipment?
- Do you have a dedicated SPH Coordinator?

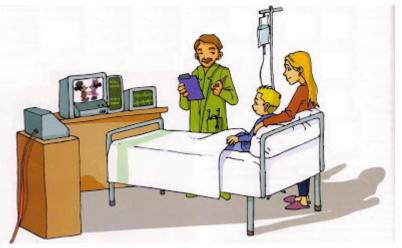


# What are the threats to patient safety?





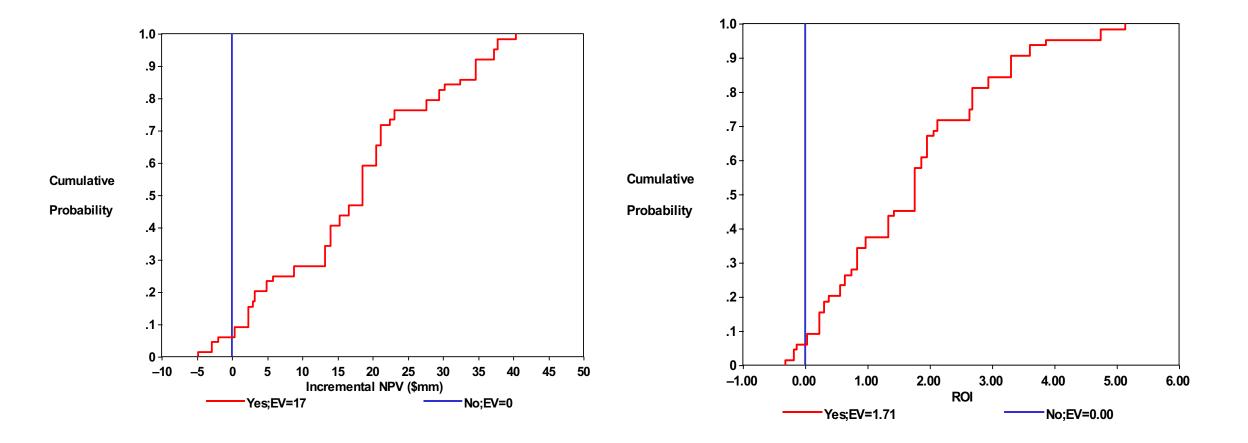
# What are the threats to worker safety?



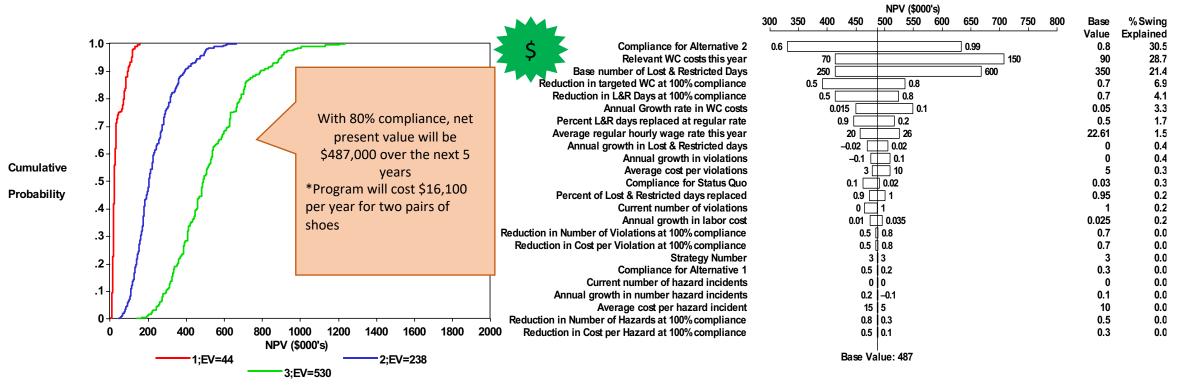
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## There is a 95% chance a Culture of Safety initiative will positively impact SHC cash flow, with a mean contribution of \$17m NPV over 5 years with 171 IRR.



## Return on Investment for Housekeeping Shoes for Crews Campaign

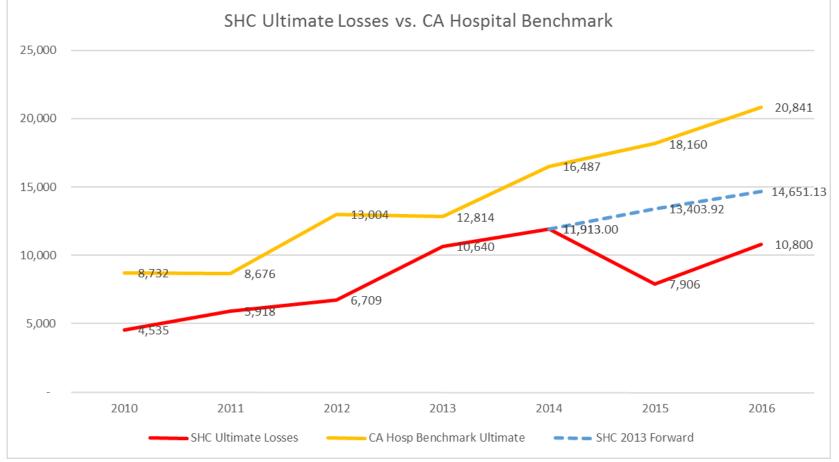


- Scenario 1: current program (none) net present value (NPV) is \$44,000
- Scenario 2: Voluntary program where housekeepers buy own shoes NPV is \$180,000
- Scenario 3: Hospital purchases shoes and monitors thru **OBSERVATIONS** program NPV is \$487,000
  - Current Impact on staff injuries in 2.5 years has been over \$200,000 in savings

MEDICINE The Risk Authority

Stanford

## Hospital A: Workers Compensation Benchmark Analysis



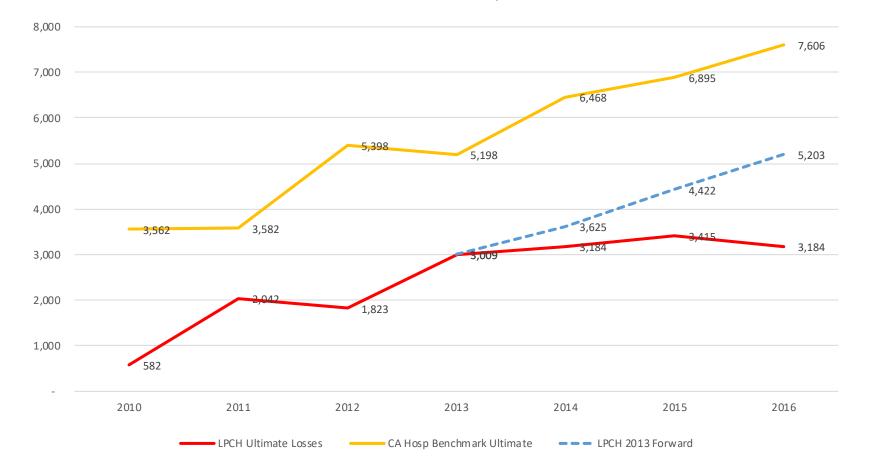
The difference in 2013 trend forward (dashed blue line) to actual is a savings of **\$9.3M** 

Data Source: Milliman



## LPCH Workers' Compensation Benchmark Analysis

LPCH Ultimate Losses vs. CA Hospital Benchmark



The difference in 2013 trend forward (dashed blue line) to actual is a savings of \$3.5M

Data Source: Milliman



The Net Present Value (NPV) is the net amount of money that your investment will make today compared to an alternative investment, e.g. stock market.

## Using Net Present Value evaluate different scenarios.

A neighbor is very appreciative you house-sat for them over the holidays. They offer you two options as a gift:

- Option 1: \$340 now
- Option 2: \$360 in one year

Which one is the better financial deal?

Present Value of Option 1

= \$340

#### Present Value of Option 2

- = \$360 [Discount factor]
- = \$360 (\$360 \* 5%)
- = \$360 \$18
- = \$342 Present Value





## Using NPV to make a decision.

Let's consider a hospital safety program.

You have identified an opportunity to save millions for your hospital by investing in a safety program.

In the most likely scenario, you think you will save \$6M over four years.

The program will cost \$2M for equipment and staff training in year 1, with ongoing costs of \$500k each year.

Would you make this investment?





### How do we calculate the NPV and ROI? -

Initial Cost (C)	-2
Time period	4 years
Discount Rate	4%

1.	Determine the initial investment cost (C)	Year	1	2	3	4
2.	Determine the time period (t)	Costs	-2	-0.5	-0.5	-0.5
3.	Determine discount rate (i)		L	0.0	0.0	0.0
4.	Determine the estimated costs and revenues for each year	Revenues (E.g. EV - assume we've calculated this)	0	1.5	2	2.5
5.	Calculate the discounted cashflows for costs and revenue = $P/(1+i)$ $\uparrow$ t)	Discounted Cashflows Costs	-2	-0.48	-0.46	-0.44
6.	Calculate the total discounted cashflow	Discounted Cashflows Revenue	0	1.44	1.85	2.22
7.	Calculate the NPV by summing the cashflows	Total Discounted Cashflow	-2	0.96	1.39	1.78
8.	Calculate the ROI = (Revenue + Costs) / (-)Costs / t					
		NPV Costs	-3.39			
		NPV Revenue	5.51			
		Net Present Value	2.13			
		ROI	16%			



#### Safe Patient Handling - Return on Investment Model

[For Demonstration Purposes Only]
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Version	
Prepared by	
Sponsor	

17-Apr-19 Simon Mawer Ed Hall

#### Model Summary for 'Optimal Program'

Expected change and total value over 5yrs

Reduces Workers Compensation by 50%, resulting in \$2,547,002 savings
Reduces Employee Turnover by 50%, resulting in \$2,373,686 savings
Reduces Stage 1-2 HAPIs by 20%, resulting in \$1,936,743 savings
Reduces Lost & Restricted Days by 50%, resulting in \$1,673,091 savings
Reduces Stage 3-4 HAPIs by 30%, resulting in \$1,155,970 savings

\$10.9M
\$-7.6M
\$3.3M NPV
37%
66%





#### Model inputs

3 Scenario \$ 3,262,967 Expected Value <--model is running numbers for this Scenario

Pilot Program

1 Pilot Program Some equipment + minimal training + limited scope

2 Basic Program Equipment + Single Annual Training + House-wide

3 Optimal Progran Equipment + Lift Coaching + In-Situ Staff Training + House-wide

NPVs for Comparison \$ 1,052,357 <--fill in manually \$ 1,417,696 <--fill in manually \$ 3,262,967 <--fill in manually

Basic Program Optimal Program

Big priorities: investigation capabilities + space for training. is there a correllation bet. Injuries + census?

#### FINANCIAL PARAMETERS

SCENARIOS

Discount Rate	15%
Number of hours in a work day	8
Reference Year	2019
Change year	2020
Standard Growth Rate	3%

Ranges							
	TO ALL SCENARIOS)	١	Norst case		Base case		Best case
	Stage 3-4 Reduction Rate		3%		10%		30
	Stage 1-2 Reduction Rate Stage 3-4 Reduction Rate		1%		5%		20
	Patient Falls Reduction Rate		3% 1%		10% 5%		15
	Reduction on PH-related turnover		8%		30%		50
	L&R Reduction Rate		8%		30%		50
	WC Reduction Rate		5%		20%		50
	MedMal Reduction Rate		4%		15%		2
Benefits							
	Cost of fraining venue			Ψ	100,000.00	Ψ	100,000.
	Cost of Training Venue	\$	10,000.00	e e	100,000.00	e e	100,000.
	Laundry Equipment & Maintenance	\$	5,000.00 10.000.00	\$ \$	130,000.00 160,000.00	3	130,000.0
	Hours of Training		0.25		2.00		0.
	% Clinical Staff Trained Annually		10%		100%		10
	Lift Coaches	\$	-	\$	-	\$	1,000,0
	Program Coordinator FTEs		0		1		
Ongoing Annua							
	Hours of Traning		1.00		2.00		0.
	% Existing Staff to be Trained		10%		100%		100
	Program Implementation Costs	\$	10,000.00	\$	50,000.00	\$	50,000.0
	One-time Equipment costs	\$	100,000.00	\$	1,200,000.00	\$1	,500,000.
Setup Costs							

Medical Malpractice Costs (baseline)			
Med Mal Costs (baseline)	\$ 319,200.00	\$ 399,000.00	\$ 478,800.00
MedMal Growth Rate	4%	5.0%	6%
MedMal Ref Year	2018	2018	2018
Malpractice Reduction Rate			
MedMal Change Year	2020	2020	2020
MedMal Change Period	4	4	4
Maddel Deduction Date	202	AFA/	200/

#### ASSUMPTIONS

Overhead lifts Slings, etc. Pilot program - 2-3 high-risk units that comprise 30% of losses.

#### \$1M for Lift Coaches

In Basic, requires 2hr training course. Optimal is in-situ via Lift Coaches Basic + Optimal is same Basic + Optimal is same

Stanford achieved 50% reduction since 2009.

Pilot Program - assume achieve 25% of 'basic program' impact because It

Falls and Pressure Ulcers claims. Av. industry cost=\$133k per CNA clos Based on historical data + projection

Medmal takes 4yrs to mature

#### Stanford MEDICINE

The Risk Authority

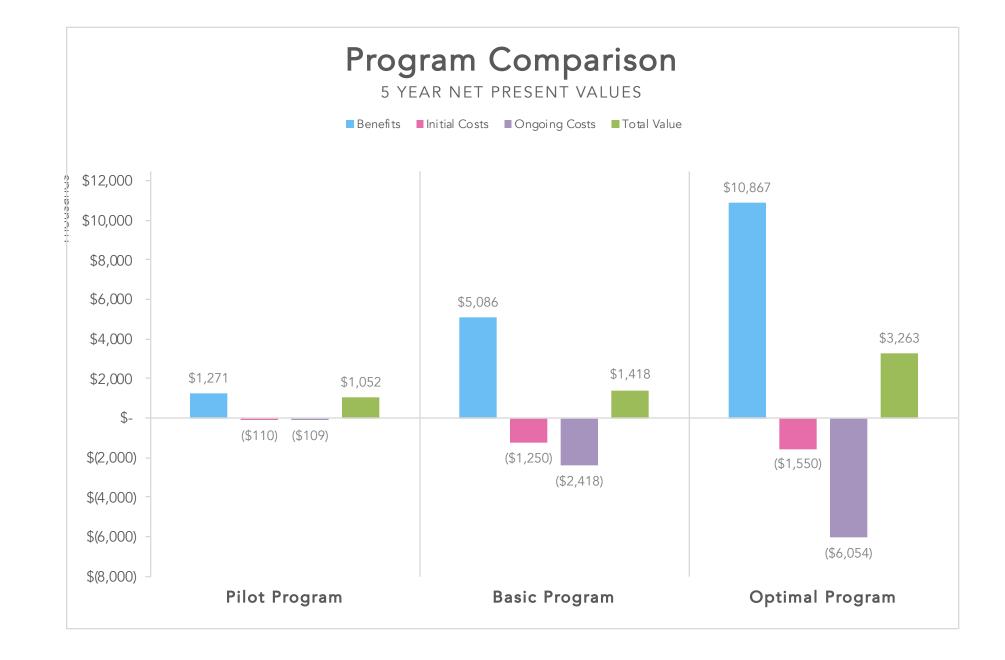
( +>1)4K		HÝANÝ A-	'\gtHØy	6. 015-\1HB)(3	
Scenario Expected Value		is running numbers &			
				mparison	
1 Pilot Program 2 Basic Program 3 Optimal Progr	Some equipment + minimal training + limite Equipment + Single Annual Training + House ann Equipment + Lift Coaching + In-Situ Staff Tra	rd scope r-wide	\$ 808 \$ 2,604 r \$ 5,158	A24 <-61 in manual 160 <-61 in manual 486 <-61 in manual	
	am Equipment + Lift Coaching + In-Situ Stoff Tra	ining + Nouse-wide	\$ 5,159	406 <-61 in manual	ASSUMPTIONS NEXT STEPS
Setup Costs	One-time Equipment costs	\$ 100,000.00 \$ 10,000.00	\$ 1,500,00 \$ 50,00	1.00 \$ 1,500,000.00	
	One-time Equipment costs Program Implementation Costs % Existing Staff to be Trained Hours of Training	\$ 100,000.00 \$ 10,000.00 10% 1.00	\$ 50,00	1.00 \$ 1,500,000.00 1.00 \$ 50,000.00 00% 100% 2.00 0.2	Pilot program - 2-3 high-risk units that comprise 30% of losses.
Orgoing Annua	( Cente	1.00		2.00 0.2	
	Program Coordinator FTEs Lift Coaches % Clinical Staff Trained Annually Hours of Training	\$.	s	1 - \$ 1,000,000.00 00% 1007	Lift Coaches: \$1.2M
	% Clinical Staff Trained Annually Hours of Training	10%	1	2.00 0.2	In Basic, requires 21r fraining course. Optimal is in-situ via LiR Coaches Basic = Optimal is same Basic = Optimal is same
	Laundry Equipment & Maintenance	\$ 5,000.00 \$ 10,000.00	\$ 130,00 \$ 160,00	1.00 \$ 130,000.00 1.00 \$ 160,000.00	
Denefts	MedNal Reduction Rate	3.00%		15% 202	100k training cost. 200m new hino ofentation SDwks per year. 150m new hino training - 3mrulday, 25 weeks. 2110.
	Madhal Reduction Rate WC Reduction Rate L&R Reduction Rate Reduction on Privaited tarrown Patient Falls Reduction Rate Singe 5-2 Reduction Rate Singe 5-3 Reduction Rate	4.00% 6.00% 6.00%		15% 20% 20% 40% 20% 50% 30% 50% 10% 15% 5% 15% 10% 20%	150hrs wheaher training 3hraiday, 26 weeks. 2110. Pilot Program - assume achieve 20% of basic program impact because high-fask, high-focus groo
	Reduction on PH-related turnover Patient Falls Reduction Rate	6.00% 2.00% 1.00% 2.00%		30% 50% 10% 15%	Plot Program - assume achieve 20% of basic program impact because high-lisk, high-focus prog
C*+; I&HOMK Ranges		U Algât\ç%	'\cfilt\cf	is ¥pāt∖ç‰	
Medical Malora					
Medical Malpra	clice Costs (baseline) Med Mai Costs (baseline) MedMai Gravith Rate MedMai Raf Year duction Rate MedMai Chanae Year	\$ 160,000.00	\$ 200,00	1.00 \$ 240,000.00	Falls and Pessaue Licens. SLMRT: Freq 2lyr, 2015-2018, 580k av; Av. industry cost=\$132k per l
	MedMai Growth Rate MedMai Ref Year	4% 2019		1.0% 60 2019 201	, mg - , man - , man - g - aak per -
Malpractice Re	duction Rate MedMai Change Year MedMai Change Period MedMai Reduction Rate	2020		2020 2020	
APRICA TRIA		3 24%		3 3 30% 361	Medmal takes 3yrs to mature
Patient handlin	g workers comp (baseline) WC costs (baseline)	\$ 1.725 362.00	\$ 2,101,26	2.00 \$ 0.407 041 ~~	2011-2017 Average annual: 51.16M SD: 5436k - patient handling only. NOTE: Added 51M to card
	Number of claims WC growth	\$ 1,725,262.00 72 4% 2019	- 2,00,25	2.00 \$ 2,597,262.00 98 124 5.0% 65 2019 201	2011-2017 Average annual: \$1.10M SD: \$436k - patient handling only. NOTE: Added \$1M to cap 2013-2018 Av 98 SD 26
Employee Injur	WC ref year / Reduction Rate				Average per claim 2013-2017 \$11.6k. \$3k SD
	workers comp (baseline) WC costs (baseline) WC aparts WC aparts WC aparts WC aparts Reduction Rate WC Change Pariod WC Reduction Rate	2020 3 32%		2020 202 3 3 42% 485	Achieved 50% reduction since 2009. With renewed boux, expect further 50%.
Apile II Sigila (1997) Staff Davias an	il ç	32%			
Staff Replacem	LC ext Costs 2/2 Handling hybries Norther of Staff Handling Patients Absordseitor mole Banatina) Amonge satiny Amonge satiny Absordse 3/2 handling hybries Temporary datability leave Add's for Agency lass LBR Costs + Agency lasseline) Carsult Rolls Reference Year Chartor View	2110		2190 219	Need job codes for relevant SHC employee population (or number of staff)
	Average salary Absertee 2/2 handling injuries	9% \$ 150,000.00 3%	\$ 150,00	2110 211 10% 12% 1.00 \$ 180,000.00 4% 5%	
	Temporary disability leave Add % for Agency Lee	\$ 911,520 125% \$ 1,129,400	\$ 1,266 1 \$ 1,582		Total temporary paid disability payments is \$500-600k per year, Agency costs is about 50% add
	Lax Losts + Agency (baseline) Growth Rate Defense a Yang	\$ 1,139,400 3% 2019	\$ 1,582	500 \$ 3,828,364 3% 25 2019 201	rozai temporary paid disability payments is \$600-600k par year; Agency costs is about 50% adds
L&R Reduction	Change Year				
	Change Year Change Period L&R Reduction Rate	2020 4 32%		2020 202 4 4 40% 48%	UP, Changer 19, Peductor
Number of Emp					
	Soyees Handling Patients Number of SHOC Employees (RNe, Techs, etc.) Number of Employees Growth Rate Number of Employees Reference Year Securit & Train Numes or Tech Initial Average Cost to Recruit & Train a a Nume o Growth Rate Reference Year	2,110 4% 2019	2	110 2,110 5% 6% 2019 201	Per Tina. Will need job codes for relevant SHC employee population (or number of staff)
Average Cost to	Number of Employees Reference Year Recruit & Train a Name or Tech				
	anne reelage Lost to Hecruit & Irain a a Natse o Growth Rate Reference Year	x 125,000 3% 2019	150	000 175,000 3% 3% 2019 201	
HR Issues	Staff turnover rate			11% 12% 5% 0	SHC Executive Dashboard (2013) 1 in 12 staff have an injury, 25% are SPH related. PH injuries are #1 reason to leave profession.
	Staff turnover rate Turnover related to injuries Reduction on PH-related turnover Change Year Change Period	9% 4% 45% 2020 4		11% 127 5% 67 50% 557 2020 202 4 4	1 in 12 staff have an injury, 25% are SPH related. PH injuries are #1 reason to leave profession.
\809/51\%c	Change Period	2020		4 202	
Fals	Average cost of fail	5 12,256,03	\$ 15.22	04 5 18.385.22	Gabrath et al (2011). Haines et. al. (2012). Health Research & Educational Trust. (2019)
	Nerge cor or an Reference Year SHC Patient Days Reference Year	\$ 12,256.83 2019 145000	5 15,32 145	2019 201	Californi et al (2011), Hanes et al. (2013), Hearn Hesserch & Loucational Hatt. (2016) SHC (2018) FY18 Annual Disclosure
	Reference Year	2018		000 14500 2018 201 0.5% 0.61	
	n per 1000 patient days (as %) % falls resulting in harm	16%		20% 241	2% of hospital stays; 3.3-11.5 falls per 1,000 patient days. Bouldin et al (2013) 33% per Health Research & Educational Trait. (2016)
	Number of falls with harm Patient Falls Costs (Baseline)	93 \$ 101,909.44	\$ 444,31	145 205 2.16 \$ 921,321.55	
Fall Reduction	Growth Rate Rate	2%		2% 25	
	Change Year Change Period Patient Falls Reduction Rate	2020 3		2020 202 3 3	
6H4;	Patient Falls Reduction Rate	12%		15% 187	felled.cte
Stage 1-2 HAP	Average cost of Stage 1-7 HADI	\$ 3,706.00	5 4**	2.50 \$ 5,559.00	THE EXCHANGES CARL IN SERVICE STREET, THIS IS JUST ONLY \$4,000, SINGLE 2 THIS
	Average cost of Stage 1-2 HAP1 Growth Rate n HAPIs per 1000 patient days n per 1000 patient days (as %) Number per year Reference Year	3%	\$ 4,63	3% 20	range between \$3,000-\$10,000 (Septz, et al. 2013), increased to 2019 dollars 0.57 school are Deviced, 2010.
	n per 1000 patient days (as %)	0.3%		0.57	Detrements 20, 000-310,000 (pergr, et al. 2010), increased to 20114 dolars 0.57 global per Romania (2010) Assume 75% are Stage 1-2
Stage 3-4 HAP	Reference Year	495.9 2019	615	0.4% 0.5% 1875 740.8 2019 201	
stage 3-4 HAP	Average cost of Stage 3-4 HAPI	\$ 13,271.84	s 10,50	a.ao \$ 19,907.70	The incremental cost of treating stage 3 PUs range between \$5,900-\$14,040,
	Growth Rate n per 1000 patient days (as %)	2% 0.1%		2% 25 2.1% 0.25	The incremental cost of teading stage 3 PUs range between 55,800-\$14,040, and intege 4 Pus cost as much as \$11,730-\$21,410. (Septz, et al. 2013) Assume 325 as 32 sage 3-4
	Number per year Reference Year	165.3		1625 247.9 2019 201	POR Period
HAPI Reduction		2020		2020 202	
	Change Year Change Petiod Stage 1-2 Reduction Rate Stage 3-4 Reduction Rate	4.1		4 4	
	Stage 34 Reduction Rate	12% 16%	2	15% 187 20% 247	The second se
Length of stay					
alali K Açılış					Campo et al. 2012 showed 5% induction in LDS Adler et al. 2012 found no exidence of improved LDS
	One-time Equipment costs	1,000,000	\$ 1,500,00 \$ 50,00	1.00 \$ 1,800,000.00 1.00 \$ 60,000.00	Overhead lifts, stings, etc.
	One-time Equipment costs Program Implementation Costs Toking Costs (HR wages) Total Setup Costs	37,500 0 \$ 1,037,500.19	\$ 1,550.00	1.00 \$ 60,000.00 1.25 \$ 0.30 1.25 \$ 1,660,000.30	Consultants, etc. Optimal: 1500 staff for 1 hour
ti Ati Li Aqi: Program Staff					
Program Staff	Coats Program Coordinator FTE's Coordinator Salary	1		1	
	Coothers Lift Coaches Total staff costs	100,000 900,000 \$ 1,000,000	\$ 125,00 \$ 1,000,00 \$ 1,125,00	1.00 \$ 150,000.00 1.00 \$ 1,100,000.00 1.00 \$ 1,250,000	
Annual Staff 1	raining				
	Hours of taining Annual taining hours	100% 0.25 527.5 60		0.25 0.2 27.5 407	HealthStream training; all other training is part of new hire
	% Cancer Star Instead Admany Hours of training Annual training hours Hourly cost of training Cost of Training Venae Total Annual training cost		\$ 7 \$ 100,00 \$ 129,55	0.25 0.25 0.2 27.5 5.27 5.00 \$ 90.00 1.00 \$ 100,000.00 2.50 \$ 147,475.00	
Equipment	Total Annual training cost	\$ 31,650.00 104.000			
	Laundry Equipment & Maintenance Total equipment costs	104,000 128,000 5 128,000	\$ 130,00 \$ 160,00 \$ 160,00	1.00 \$ 156,000.00 1.00 \$ 192,000.00 1.00 \$ 192,000.00 1.00 \$ 192,000	Sling maintenance, etc.
	Annual Maintenance Cost	\$ 1,159,650.00	5 1,424,56	2.50 \$1,589,475.00	Tank 0
	Maintenance Cost Growth Rate Maintenance Cost Reference Year	3% 2019 O	osta	3% 38 2019 Costs 201	CashiGow, C Cashi, Ref. C

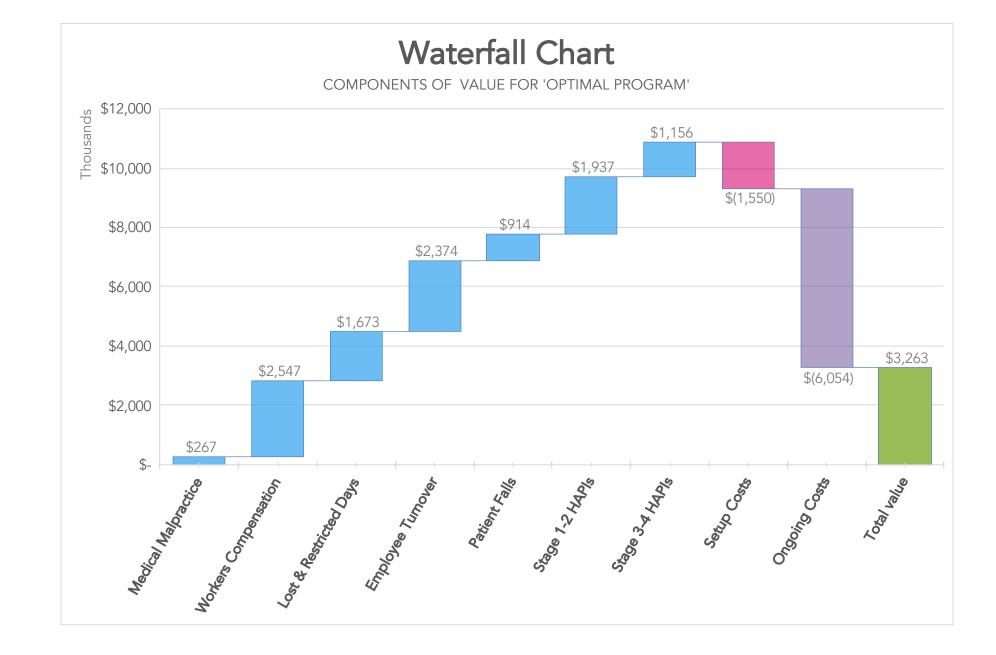




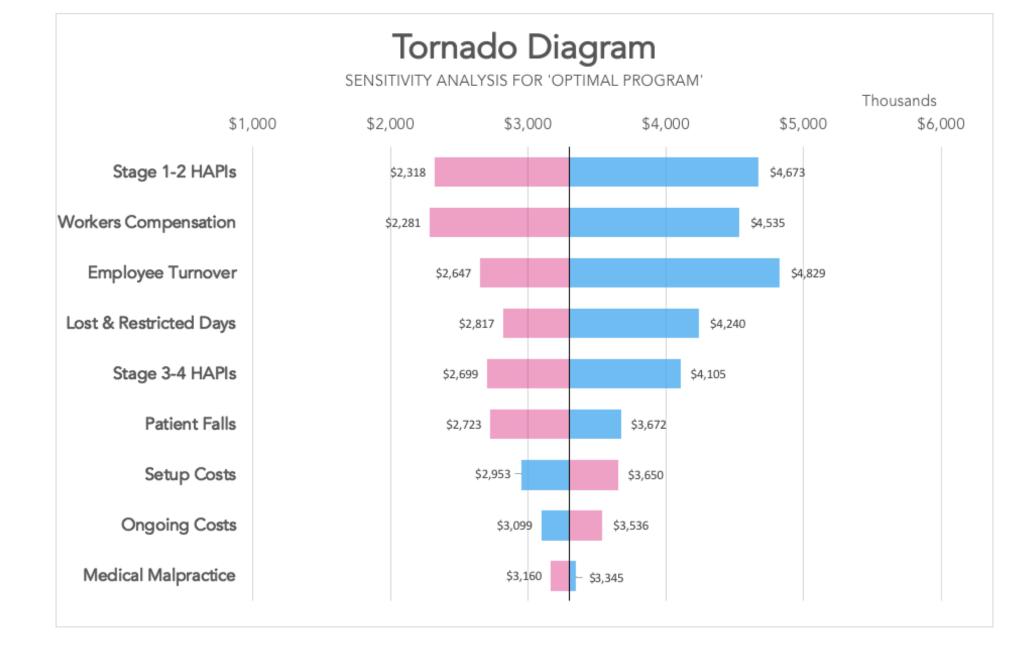
Auto-populated calculations for variable ranges

Base Case					
<b>F</b> 1 <b>V</b>	 1	2	3	4	5
Fiscal Year	2020	2021	2022	2023	2024
Medical Malpractice				+	
Med Mal Costs (baseline)	\$ 439,898 \$	461,892 \$	484,987 \$	509,236 \$	534,698
Med Mal Reduction Rate	6%	13%	19%	25%	25%
Med Mal Costs (with Intervention)	\$ 412,404 \$	404,156 \$	394,052 \$	381,927 \$	401,024
Med Mal Savings	\$ 27,494 \$	57,737 \$	90,935 \$	127,309 \$	133,675
Workers Compensation					
WC costs (baseline)	\$ 1,812,642 \$	1,903,274 \$	1.998.438 \$	2,098,360 \$	2,203,278
WC Reduction Rate	17%	33%	50%	50%	50%
WC Costs (with Intervention)	\$ 1,510,535 \$	1,268,850 \$	999,219 \$	1,049,180 \$	1,101,639
Med Mal Savings	\$ 302,107 \$	634,425 \$	999,219 \$	1,049,180 \$	1,101,639
· · · · · · · · · · · · · · · · · · ·					
Lost & Restricted Days					
L&R costs (baseline)	\$ 1,190,700 \$	1,250,235 \$	1,312,747 \$	1,378,384 \$	1,447,303
L&R Reduction Rate	17%	33%	50%	50%	50%
L&R Savings (w/ Program)	\$ 992,250 \$	833,490 \$	656,373 \$	689,192 \$	723,652
Loss & Restricted Days Savings	\$ 198,450 \$	416,745 \$	656,373 \$	689,192 \$	723,652
Employee Turnover					
Number of SHC Employees (RNs, Techs, etc)	2,060	2,122	2,185	2,251	2,319
Number of Staff Quit 2/2 Injury (baseline)	12	13	13	14	14
Average Cost to Recruit & Train	\$ 154,500 \$	159,135 \$	163,909 \$	168,826 \$	173,891
Annual Retention Cost 2/2 Injuries (baseline)	\$ 1,909,620 \$	2,025,916 \$	2,149,294 \$	2,280,186 \$	2,419,049
Reduction on PH-related turnover	13%	25%	38%	50%	50%
Total Retention Cost (w/ Program)	\$ 1,670,918 \$	1,519,437 \$	1,343,309 \$	1,140,093 \$	1,209,525
Retention Costs Savings	\$ 238,703 \$	506,479 \$	805,985 \$	1,140,093 \$	1,209,525











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- Learn how to use Excel ROI tool can be used to Calculate ROI and Net Present Value of Programs
- Learn how to read Tornado, Waterfall diagrams and what they tell you about program value.



## **Questions?**



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