

Scorecard Tool

7	Scorecard
E	Gap Analysis

Process
Control

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Analysis Goals

- With this tool, the user will be able answer the question: “Is my ED achieving and maintaining D2D split flow improvement?”
- This analysis is based on four key ED performance measure groups:
 - *PATIENT SAFETY*: Door to Doc (D2D) times and patients that Leave Without Treatment (LWOT)
 - *THROUGHPUT*: arrivals, admits, and portions of patient stay duration times
 - *SATISFACTION*: patient and staff
 - *BUSINESS LOSS*: LWOT and diversion hours

Tool 7 Data – D2D, LWOT, and Volumes

Metric	January	February
Door to Doc Frequency Distribution		
% < 0 - 30 min	9%	8%
% < 31 - 60 min	17%	16%
% < 61 - 90 min	13%	13%
% > 91 min	61%	63%
Average Door to Doc Time (min)	167	172

- Door to Doc Times by month
 - Frequency Distribution = Percent of visits seen in 0-30 min, 31-60 min, 61-90 min and greater than 91 minutes, as measured from time of arrival to time the ED physician or physician extender first examines the patient.
 - Average wait time from initial arrival in the ED to time of physician exam.

Metric	January	February
Visit Volumes		
Total Visits (with LWOTs)	7,755	7,346
Total Visits (without LWOTs)	6,677	6,106
% of LWOTs	13.8%	16.9%
% of ED Patients Admitted	27%	27%

- Visit Volumes by month
 - % of LWOT = Percent of patients who leave without treatment. Calculated: LWOTs/total visits (with LWOTs).
 - % of ED Patients Admitted = Percent of ED patients admitted to the hospital of the ED the patient visited. Calculated: total number of admitted patients/total visits (without LWOTs).

Tool 7 Data - Duration Times and Boarding

Metric	January	February
Process Event Times		
Length of Stay (LOS) (average min/patient)	394	403
Length of Use (LOU) (average min/patient)	152	151
Length of Test or Treatment (LOT) (average min/patient)		
Admitted Length of Hold (LOH) (average min/patient)	106	106

- Process Event Times by month
 - LOS = Average length of stay for all patients (from time of arrival to discharge)
 - LOU = Average time between bed entrance and disposition or decision
 - LOH = Average time between disposition or decision to ED discharge
 - LOT = Average time between first test request or start of treatment (eg. hydration) to last test interpretation or end of treatment

Metric	January	February
In-patient Holds		
Total Hours of Holds	8,236	7,214
Total Bed Capacity/Day (hours)	1,128	1,128
Holding as a Percent of Total Bed Capacity	24%	23%

- In-patient Holds by month
 - Hours of bed hold (bed boarding), total bed-hours (capacity) offered.
Calculate: Hold Hours / Bed Capacity Hours.

Tool 7 Data - Satisfaction and Business Loss

Metric	January	February
Satisfaction Scores		
Patient Satisfaction	72.6	77.7
Staff Satisfaction	3.45	3.45

- Satisfaction Scores by month
 - Patient Satisfaction scores usually available monthly.
 - Staff Satisfaction scores as available, often quarterly or annually.

Metric	January	February
Other Statistics		
LWOT "Lost" Net Income	\$596,070	\$688,200
Diversion Hours	78	113

- Other Statistics include Business Loss by month
 - LWOT "Lost" Net Income = Potential net income lost due to patients who leave without treatment: LWOTs* ED outpatient average net revenue.
 - Diversion Hours: Number of hours that ambulances were turned away.

The EXCEL[®] Tool 7

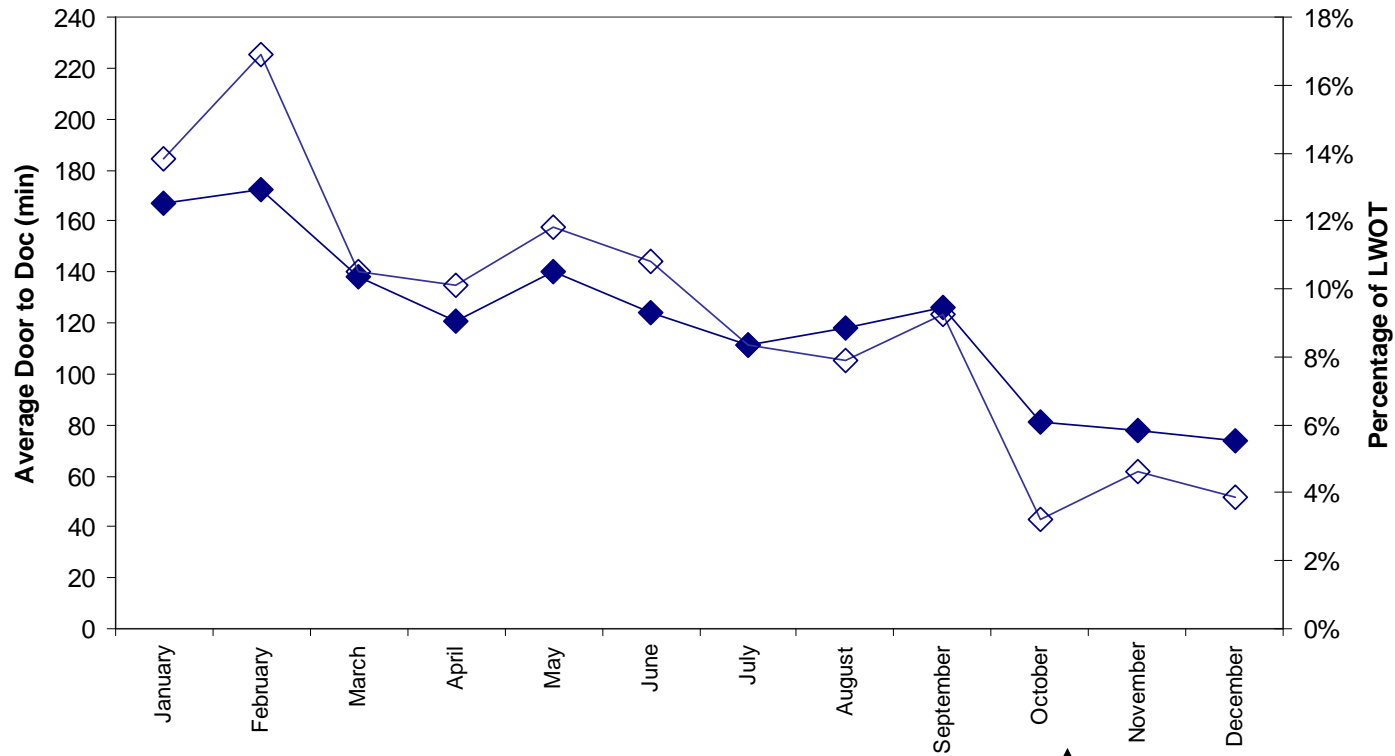
ED Metrics Score Card									
Hospital Name and Year Printed Here									
Metric	Target	January	February	March	Q1	April	May	June	Q2
Days in the Month		31	28	31	90	30	31	30	91
Door to Doc Frequency Distribution									
% < 0 - 30 min		9%	8%	10%	9%	12%	9%	12%	11%
% < 31 - 60 min		17%	16%	21%	18%	24%	21%	22%	22%
% < 61 - 90 min		13%	13%	17%	14%	17%	16%	17%	17%
% > 91 min		61%	63%	52%	58%	47%	54%	49%	50%
Average Door to Doc Time (min)		167	172	138	159	121	140	124	129
Visit Volumes									
Total Visits (with LWOTs)		7,755	7,346	7,354	22,455	7,028	7,253	6,187	20,468
Total Visits (without LWOTs)		6,677	6,106	6,578	19,361	6,316	6,392	5,521	18,229
% of LWOTs		13.8%	16.9%	10.5%	13.8%	10.1%	11.8%	10.8%	10.9%
% of ED Patients Admitted		27%	27%	26%	27%	24%	23%	23%	23%
Process Event Times									
Length of Stay (LOS) (average min/patient)		394	403	361	386	332	348	344	341
Length of Use (LOU) (average min/patient)		152	151	159	154	150	156	157	154
Length of Test or Treatment (LOT) (average min/patient)					0				0
Admitted Length of Hold (LOH) (average min/patient)		106	106	93	102	88	82	92	87
In-patient Holds									
Total Hours of Holds		8,236	7,214	6,276	21,726	4,799	4,636	5,044	14,478
Total Bed Capacity/Day (hours)		1,128	1,128	1,128	1,128	1,128	1,128	1,128	1,128
Holding as a Percent of Total Bed Capacity		24%	23%	18%	21%	14%	13%	15%	14%
Satisfaction Scores									
Patient Satisfaction		72.6	77.7	73.2	74.4	78.6	76.9	79.3	78.2
Staff Satisfaction		3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45
Other Statistics									
LWOT "Lost" Net Income		\$596,070	\$688,200	\$430,680	\$1,714,950	\$398,720	\$409,836	\$329,670	\$1,138,226
Diversion Hours		78	113	143	334	179	189	222	590

Using the Tool 7 'Scorecard'

- Methods to collect scorecard data (automatic methods preferred)
 - Emergency Department IT System
 - Manual ED Log with Random Patient Sampling; consult your management engineer for ED Log creation and the Scorecard Definitions for external ED data sources.
- Metrics may be added or deleted to fit an ED needs.
- Longitudinal plots of D2D time and LWOT%, the patient safety foundations of this toolkit, are automatically generated.
- Tool 7 monitors overall metrics and detailed components, both as split flow is implemented to see gains, and after implementation to verify gains are maintained (next slide example).
- Individual elements of the scorecard reveal problems arising.
- Keeping scorecards for several facilities can help you compare results (upcoming slide example).

Test of Change (TOC) Monitoring

Monthly D2D and LWOT% Trends

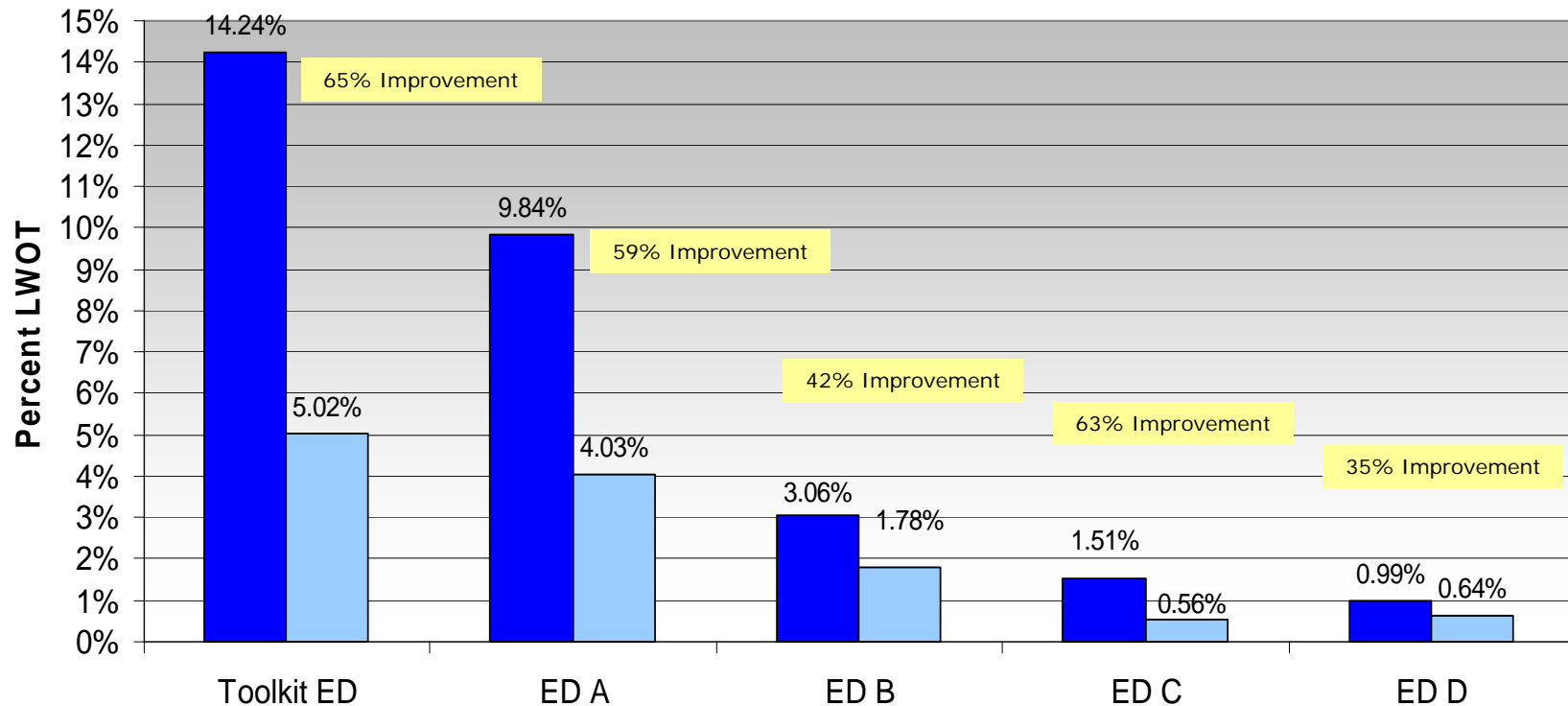


Note: Seasonally, November / December would have climbed back up to January / February levels without the D2D Patient safety intervention.

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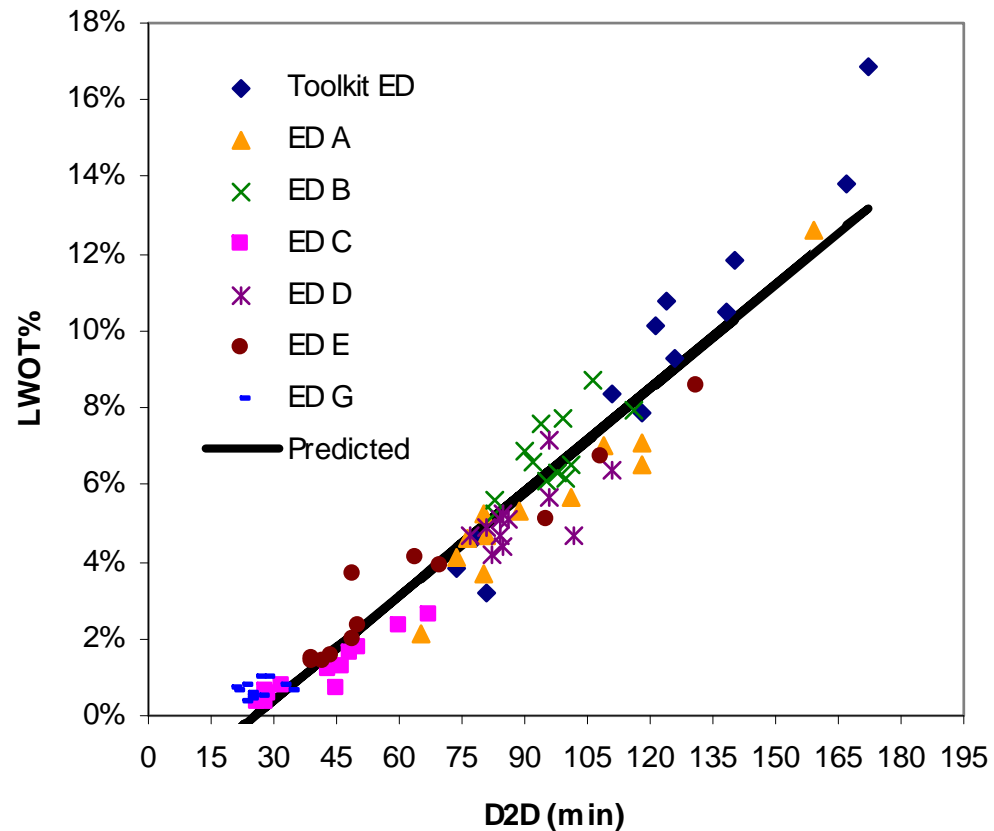
Improving Patient Safety by Reducing LWOTs – A Multi-Hospital Comparison

Hospitals - LWOT Percentage Pre/post New Process Implementation



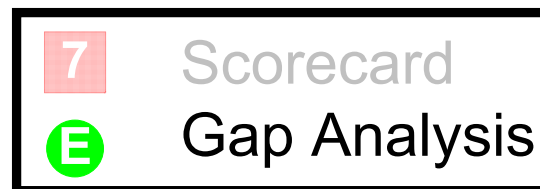
Patient Safety Meets Operational Performance: Evidence of Relationship Between LWOT% and D2D Time (2006 Data)

- There is a strong relationship between LWOT% and D2D time.
- A linear model (shown) explains 93% of the LWOT% /D2D data variation (correlation coefficient = 0.96).
- There is actually a theoretical nonlinear relationship between LWOT% and D2D that we develop in [1].



Summary – Next Step

- Decreases in LWOT that our eight hospitals have seen annualizes to 12,000 ED visits made because of D2D. Those patients would have walked out before.
- Tool 7's scorecard provides visibility into monthly-level performance measures. How do managers maintain daily process integrity? Next Step E -



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References

- [1] derives the theoretical nonlinear relationship between LWOT% and D2D.
[2] uses LWOT formulas from Tool 1 to predict financial impact in Tool 7.
[3] shows Tool 7 in an extended version in context with a total ED change project.

- [1] Cochran JK, Broyles JR. Managing Emergency Department Capacity Planning Driven by Patient Safety. *Management Science* 2007. *In preparation*.
- [2] Broyles JR, Cochran JK. Estimating Business Loss to a Hospital Emergency Department from Patient Reneging by Queuing-Based Regression. *IIE Industrial Engineering Research Conference*. 6 pages on CD-Rom. Nashville, TN; pp. 613-618 2007.
- [3] Burdick TL, Cochran JK, Kisiel S, Modena C. Banner Health / Arizona State University Partnership in Redesigning Emergency Department Care Delivery Focusing on Patient Safety. *19th Annual IIE Society for Health Systems Conference*. 8 pages on CD-ROM. New Orleans, LA; 2007.