t-PA Flight Plan

Door to Needle Time < 60 minutes

Presented by:
Sunil Bhopale, MD, FACEP
Emergency Department
Sheryll Domingo, RN
Stroke Program Coordinator

San Mateo County
4th Annual Stroke Conference
November 30, 2012

REDWOOD CITY MEDICAL CENTER

KAISER PERMANENTE®

Presentation overview:

- Objectives
- Stroke 101
- Stroke Care Evolution in the Emergency Department
- Door to Needle time < 60 minute strategies
- Data

KAISER PERMANENTE®

Objectives:

- Review stroke physiology
- Discuss available stroke treatments
- Describe challenges with stroke diagnosis and treatments
- Understand the importance of individual roles during acute stroke management
- Identify opportunities for improved stroke care in the Emergency Department

KAISER PERMANENTE®

Stroke 101: Quick Overview

- Ischemic Strokes
  - Cardioembolic Stroke
  - Thrombotic Strokes
  - Lacunar Strokes
  - Cryptogenic Strokes
- Hemorrhagic Strokes
  - Intracerebral Hemorrhage (ICH) or Intraparenchymal Hemorrhage (IPH)
  - Subarachnoid Hemorrhage (SAH)

KAISER PERMANENTE®

Acute Medical Treatments

- Ischemic Strokes:
  - t-PA
  - Other blood thinners
  - Neuroprotectants
  - Endovascular treatment
- Hemorrhagic Strokes
  - Blood “thickeners” and treat cause
  - Lower brain pressure

KAISER PERMANENTE®

Acute Ischemic Stroke Medical Treatments

- Blood pressure management
- Antiplatelet therapy
- IV thrombolysis
- Endovascular treatment
  - Merci clot removal (“corkscrew device”)
  - Intra-arterial t-PA
  - Intra-arterial t-PA with mechanical thrombectomy
  - 2008 Penumbra device (“vacuum cleaner”)
  - Early 2012 Solitaire Stent Retrieval Device
  - 2012 TREVO device

KAISER PERMANENTE®

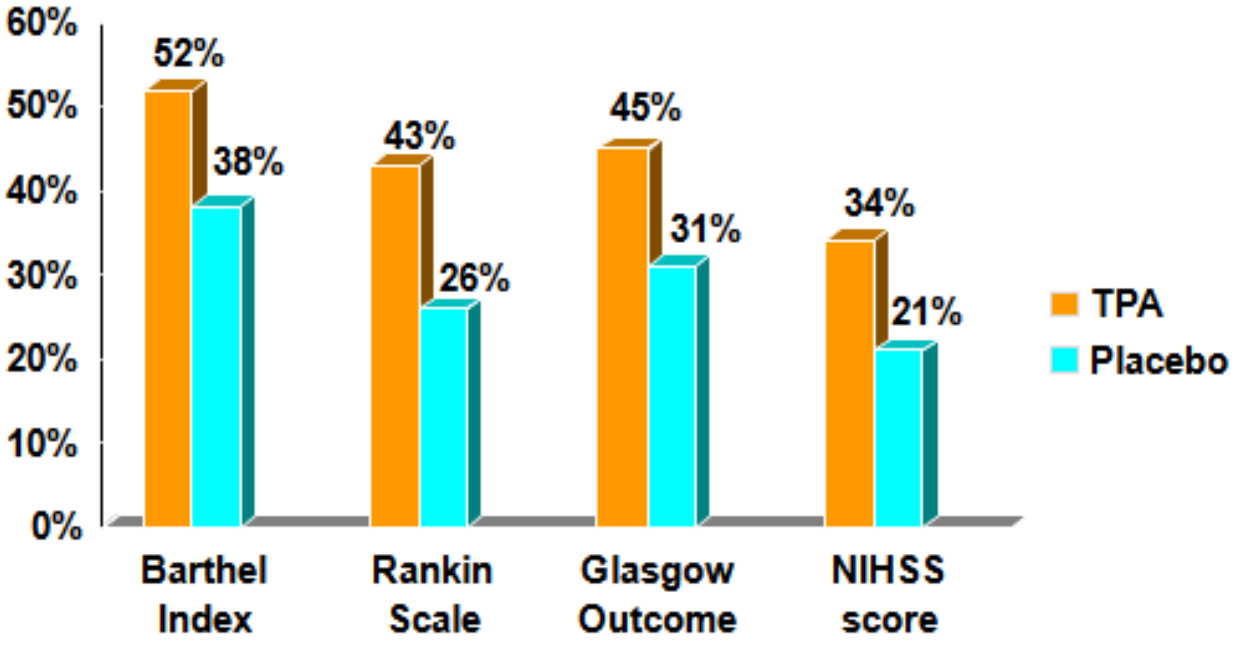
Stroke Care Evolution in the ED

- 1995 - NINDS trial showed benefit of t-PA
  - Benefit of t-PA – 30% of patients will show a significant improvement in neurological function at 3 months after event instead of 20%
- 1999 Cleveland Trial – t-PA had no benefit and resulted in increased intracranial hemorrhages
- Early 2000s – t-PA use plummeted
- 2003-4 – t-PA now with some benefit

KAISER PERMANENTE®

NINDS TPA Stroke Trial

- Excellent outcome at 3 months on all scales



N Engl J Med 1995;333:1581-7

KAISER PERMANENTE®

Timing of Stroke Interventions

- Patients have far better outcomes the earlier they receive treatment
- Intravenous thrombolysis is still considered first-line therapy for acute stroke
- In 2011 for Kaiser Redwood City, less than 50% of patients got t-PA within 60 minutes of arrival

KAISER PERMANENTE®

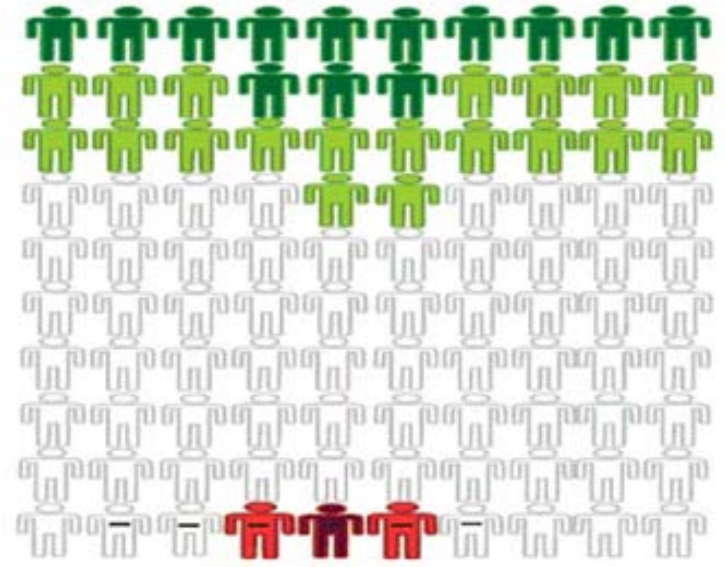
IV Thrombolysis and Stroke

- Number Needed to Treat to Benefit from IV TPA Across Full Range of Functional Outcomes

Outcome	NNT
Normal/Near Normal	8.3
Improved	3.1

For every 100 patients treated with tPA,

32 benefit, 3 harmed



From Target: Stroke, 2009

KAISER PERMANENTE®

Challenges with Stroke Identification

- Is the patient having a stroke or stroke mimic?
  - Depends on history, exam, lab, and imaging data
- Key points with:
  - History: Last known well time, seizure-like activity, waxing/waning symptoms
  - Exam: Focal deficit
  - Labs: Blood sugar, platelet count, coagulation profile
  - Imaging: Hemorrhage or infarct, vascular anatomy

KAISER PERMANENTE®

Door to Needle times Strategies

- EMS Pre-notification
- Rapid Triage Protocol
- Single Call Activation
- Stroke Tools
- Rapid Brain Imaging
- Rapid Lab Testing
- Premix t-PA
- Rapid Access to t-PA
- Team-Based Approach
- Prompt Data Feedback

Source – Target: Stroke 2009

KAISER PERMANENTE®

“Flight” Plan:
Door to Needle time < 60 minutes

What is a “Flight” Plan?

Performance Improvement Initiative

- Mutual Goal Established
  - Drill Down analysis
  - Data
- Multiple Meetings: agreement from various disciplines
- Process Flow changes → “Flight” plan
- Test of Change
- Feedback to team

KAISER PERMANENTE®

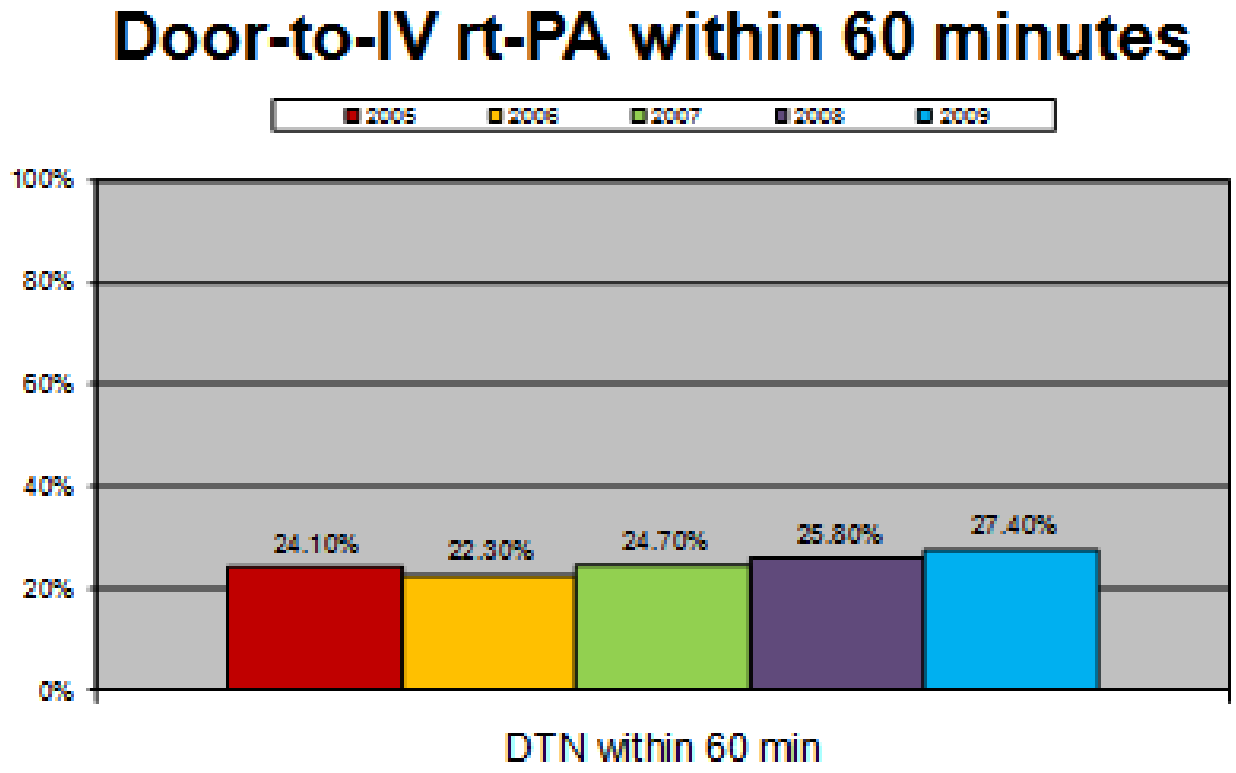
Performance Improvement Initiative: IV t-Pa Door to Needle Time (DTN) within 60 minutes

Goal: Improve our door to needle time within 60 minutes or less in 50% of our cases

KAISER PERMANENTE®

Current t-PA Administration: KP NCAL vs Overall National

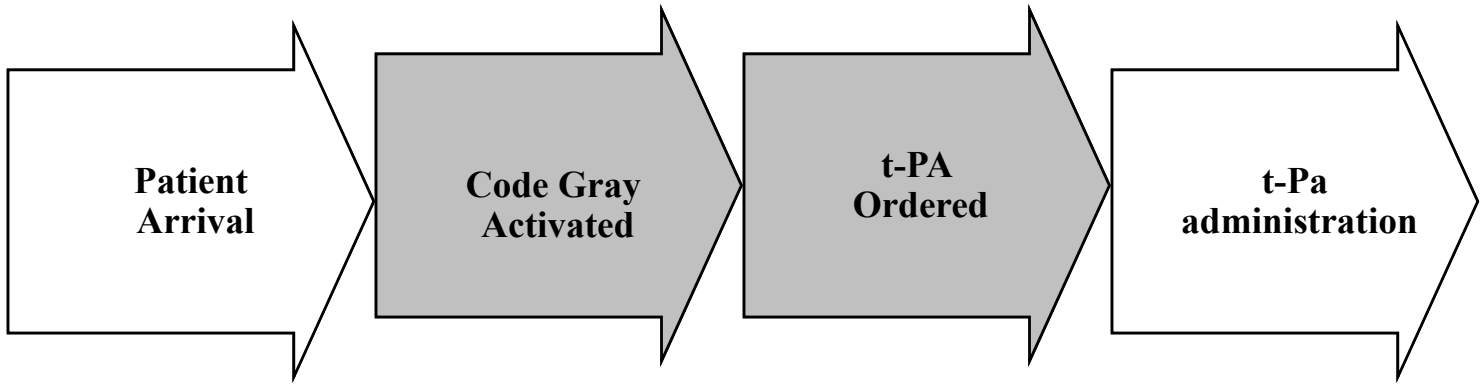
- 2-5% nationally for all stroke patients
- Kaiser NCAL: Range 1-20%, average 10%
- KP door-to-needle time <60 minutes: average = 50% since October 2011



KAISER PERMANENTE®

Drill Down Summary

- Analysis showed that we have a greatest opportunity for improvement from Code Gray activation to t-PA ordered time frame



KAISER PERMANENTE®

KAISER PERMANENTE®
Redwood City Medical Center

"Code Gray" IV t-PA: Door To Needle Time within 60 minutes

Patient arrive via EMS or NON EMS	EMS provide "flight plan" information					
ED Physician	Activate code gray within 5 minutes Review t-PA exclusion list Discuss case with neurologist Assent for IV t-PA	Green Light: •Inform CN/RN •Enter KPHC order for t-PA Red Light: Document Reason and time				
ED Clerk	Register pt in KPHC Print generic labels and affix label to lab requisition					
Charge Nurse (CN)	Call Pharmacy x5524 : provide pt weight, name and MRN	RN/CN calculate IV TPA dose while in CT	Track response time	Green Light: Call pharmacy at x5524	CN/RN final double check IV TPA dose	
Primary RN	Enter weight in KPHC Obtain/confirm 2 IVs			Ensure IV pump and IV tubing prepared	RN/CN final double check IV t-PA dose	
	Set monitor to take VS q15 min	RN/CN calculates IV t-PA dose while in CT	Insert foley and NGT prn prior to IV t-PA bolus		IV t-PA bolus given over 1 minute	
	Transport patient to radiology for CT/CTA				Perform and document m-NIHSS & VS q 15 min from time initial bolus given, then q 30min for 6h, then q 1h for 16h	
ED Technician	Place pt on monitor, Weigh pt, Place NPO sign					
Laboratory	Draw and send labs		Call back with results x1406			
Radiology	Prepare CT suite	Radiologist call back with NON-CON Head CT result				
Pharmacy	Confirm weight in KPHC	Calculate IV t-PA bolus and infusion dose		Deliver IV t-PA bolus and infusion		

Door to Needle Time ≤ 60 Minutes

Time is brain! The sooner t-PA is given the better the outcome, and the fewer the complications.

KAISER PERMANENTE®

SAN MATEO COUNTY

EMS

EMERGENCY MEDICAL SERVICES DOOR TO NEEDLE TIME "FLIGHT PLAN"

❑ **Name:** **Code 3 (circle): Yes No**

_____

❑ **Last seen normal time :** _____

❑ **Name of Family Contact:** _____

❑ **Best Contact number:** _____

❑ **Glucose (fingerstick) :** _____

❑ **Medications - any evidence that patient on *any* anticoagulant? (circle)**

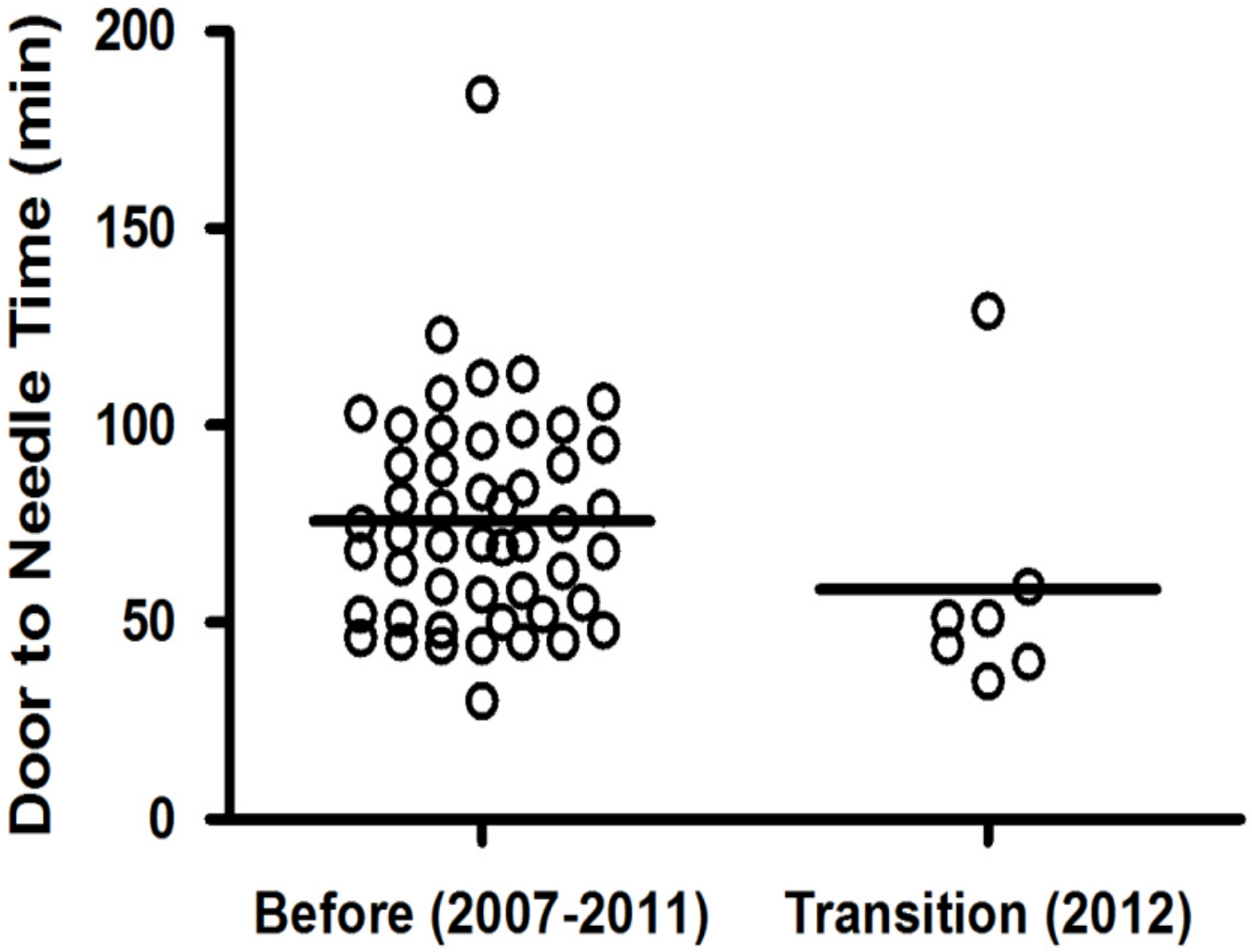
Warfarin (Coumadin)	**Dabigatran (Pradaxa)**
Heparin SQ	**Fondaparinux (Arixtra)**
Enoxaparin (Lovenox)	**Aspirin/Plavix**

❑ **Prenotify**

Door to Needle Time ≤ 60 Minutes

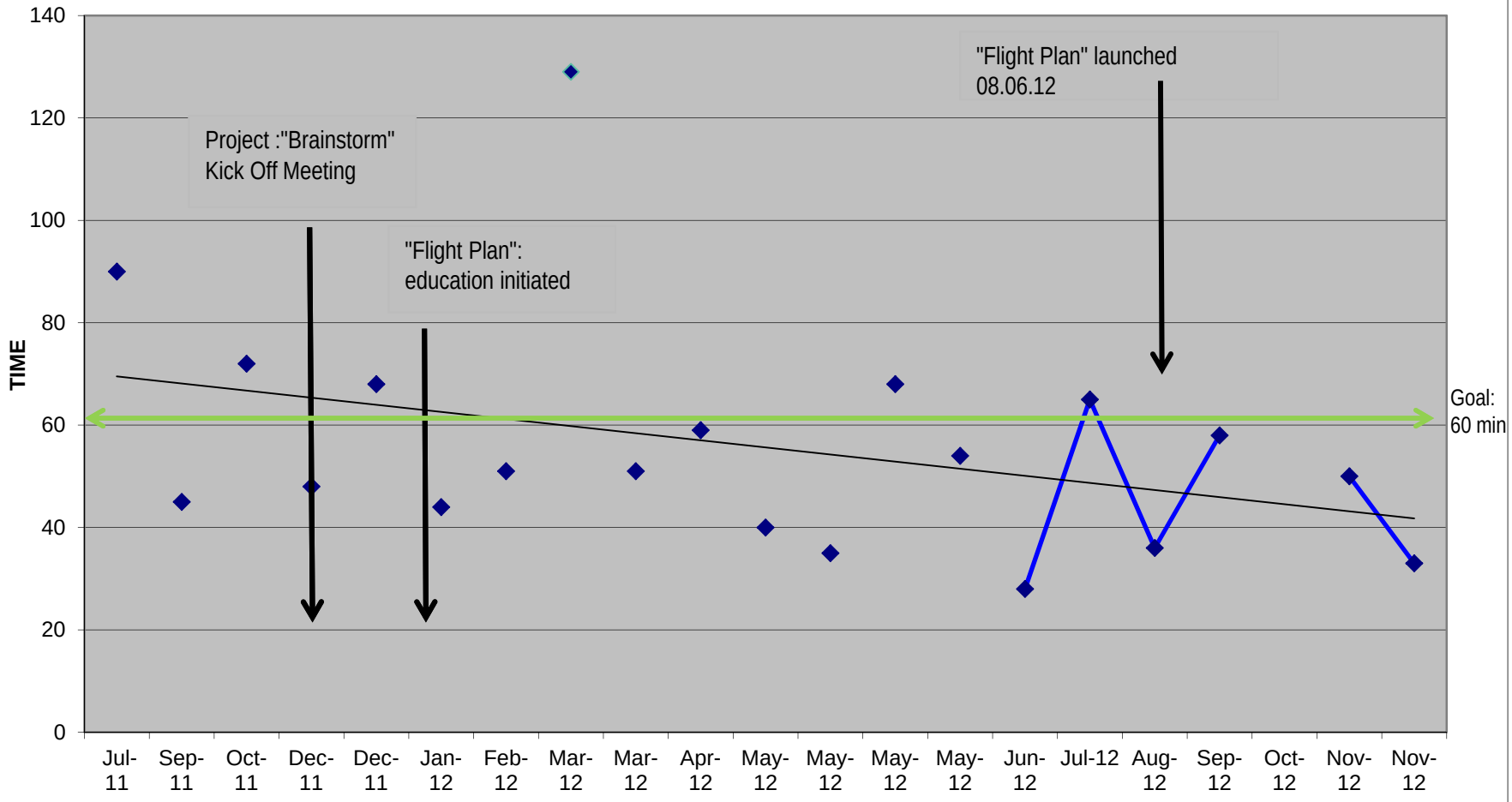
KAISER PERMANENTE®
Redwood City Medical Center

Flight Plan Introduction



KAISER PERMANENTE®

2012 IV TPA DOOR TO NEEDLE TIME WITHIN 60 MINUTES: "FLIGHT PLAN"



KAISER PERMANENTE®

ED Stroke Volume

	# of Stroke/TIA ED only	# of code gray activated (sx onset ≤ 7 hours)	#of ischemic stroke with sx onset < 4.5 hours	# of IV TPA given	# of endovascular stroke treatment cases
2010	276	145 +8 (IP)	58 +3 (IP)	12 3 (IP)	4 N=1 failed IVTPA N=3 >3-4.5 hrs
2011	282	157 +10 (IP)	42 +1 (IP)	8 1 (IP)	3 N=3 IV TPA Contraindicated N=1 (IP Code Gray- no TPA- direct to INR)
2012 Jan- Oct	207	135 +5 (IP)	48 + 1(IP)	13	10 N= 1 No IV TPA INR 1.7 N= 3 arrived > 4.5 hrs N=1 Recent SDH N= 5 s/p TPA

KAISER PERMANENTE®

IV t-Pa Utilization in the ED for Ischemic Stroke Patients arriving with sx onset < 4.5 hours

	2010	2011	2012 Jan to Oct
Number of Ischemic Stroke Patients	58	42	48
Number of IV TPA given in ED	12	8	13
Percentage of IV TPA utilization in ED	21%	19%	34%

KAISER PERMANENTE®

Critical Steps to Reduce Door-to-Needle Times

- Early ED physician MD involvement
- Getting patient weight into chart and making sure patient is NPO
- Having early discussion with patient/family re: risks/benefits/alternatives to IV t-PA
- Prenotification of pharmacy about potential t-PA patient
- Regular drill-downs of every stroke alert with ED nursing, lab, radiology, and neurology

KAISER PERMANENTE®

Importance of ED Physician Feedback

- Drill-downs of every stroke alert
- Physicians and staff congratulated when timeframes met
- One ED physician needs to be the stroke champion
- Close collaboration between ED physicians and Neurology

KAISER PERMANENTE®

Importance of ED Physician Feedback

- Form e-mail from ED MD stroke champion reviewing key issues:
  - Delay in stroke activation
  - Not obtaining CT angiogram
  - Reasons why t-PA were not given were not explicitly stated
  - Lack of NIHSS score documentation
  - No stroke education with discharge instructions
  - Delay in administration of t-PA
- Having a command in electronic medical record to include pertinent stroke data

KAISER PERMANENTE®

Results of ED Physician and Staff Feedback

- ED physicians reminded of key timeframe parameters
- ED physicians took ownership of driving stroke evaluation and candidacy for t-PA
- Better charting for QA/QI purposes

Net result: Improved door-to-needle times

KAISER PERMANENTE®

Questions?

KAISER PERMANENTE®