



Use of Flight Criteria to Reduce the Number of Flights for a Neonatal-Pediatric Transport Team: A Quality Improvement Initiative

Laura Cerny, MD, Jody Sotiropoulos, RN, Toni Clark, RN, Paula Buchanan, PhD, MPH, and John Peter, MD
Department of Pediatrics, Saint Louis University/Cardinal Glennon Children's Medical Center, St. Louis, MO, USA



ABSTRACT

Purpose: Helicopter emergency medical systems have improved survival in the adult trauma population. There is, however, a lack of clear data on the benefits of flight in pediatric and neonatal transport. There are also potential cost and safety issues associated with air transport. Furthermore, there is currently no validated tool to help determine the appropriate mode of pediatric transport, and the decision for air transport is often debated. Most agree that a flight is warranted if the time saved by flying will improve the patient's outcome. In reality, other factors also impact the decision to fly, including patient acuity, referring facility, and competition with other hospitals. We, therefore, created a tool to guide appropriate flight utilization. We hypothesized that the use of pre-determined flight criteria would reduce the number of times that flight was chosen for trips where there was limited perceived benefit.

Methods: At our Midwest tertiary children's hospital, the neonatal-pediatric transport team serves a 300 mile radius, including urban and rural communities, and performs approximately 1200 transports per year, of which about 23% are by air. We created a flight tool to help guide our decision making process when choosing the mode of transport for each mission. This tool included evaluation of patient acuity, weather, distance, traffic, team availability, and physician request. Scores were assigned to each category, and the total score guided the decision to fly versus drive. Referring physician request was pre-determined as an absolute reason for flight, weather permitting. We initiated use of these criteria on July 1, 2012 and prospectively employed the tool until June 30, 2013. We then retrospectively applied the criteria to trips from July 1, 2011-June 30, 2012 for comparison.

Results: We had adequate data to evaluate 234 of 252 flights (93%) from 2011-2012 and 233 of 249 flights (94%) in 2012-2013. The number of flights that did not meet criteria to fly was unchanged, despite implementation of a flight tool (33% retrospective versus 31% prospective, p=0.51). Of the flights that did not meet criteria to fly, we flew 67% of the time for physician request.

Conclusion: Application of pre-determined flight criteria did not change the number of times flight was chosen as the mode of transport. Two-thirds of the flights that did not meet criteria to fly traveled by air due to referring physician request. Further studies will help elucidate whether our tool is underestimating the need for flight, or if we need to provide education to referral centers on use of air transport services.

PURPOSE

- Helicopter emergency medical systems have improved survival in the adult trauma population. There is, however, a lack of clear data on the benefits of flight in pediatric and neonatal transport.
- There is currently no validated tool to help determine the appropriate mode of pediatric transport, and the decision for air transport is often debated.
- We created a tool to guide appropriate flight utilization.
- We hypothesized that the use of pre-determined flight criteria would reduce the number of times that flight was chosen for trips where there was limited perceived benefit.

METHODS

- Our Midwest tertiary children's hospital neonatal-pediatric transport team serves a 300 mile radius and performs ~1200 transports per year, of which about 23% are by air.
- We created a flight tool to help guide the mode of transport for each trip.
- Scores were assigned and the total score guided the decision to fly versus drive.
- Referring physician request was pre-determined as an absolute reason for flight, weather permitting.
- The tool was used July 1, 2012 to June 30, 2013 prospectively
- We then retrospectively applied the criteria to trips from July 1, 2011-June 30, 2012 for comparison.

FLIGHT TOOL

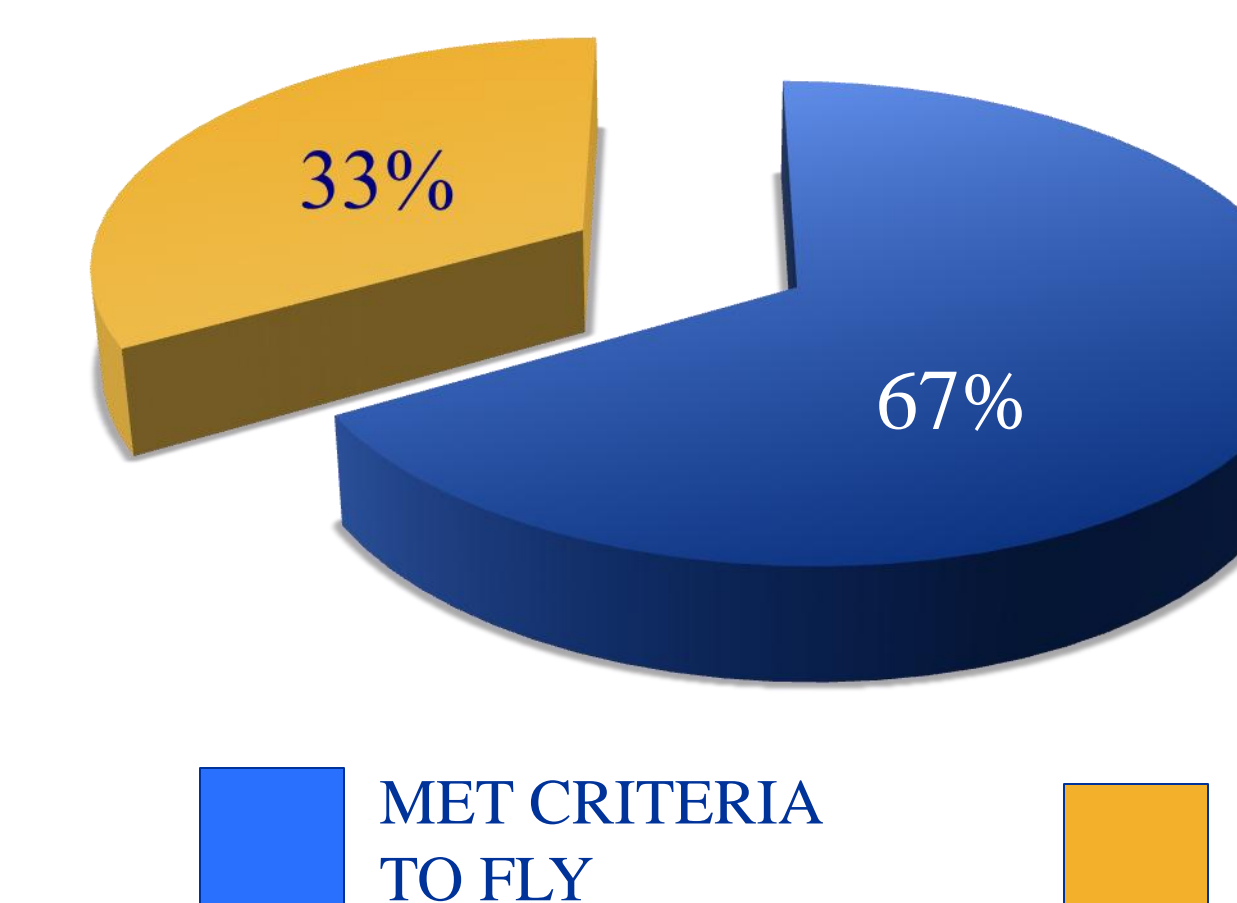
Cardinal Glennon Children's Medical Center			
Pt's Age:	Date of trip:	Time Of Cal:	
FLIGHT TOOL			
CRITERIA	Yes	No	SCORE
AIRWAY: Does pt need airway based on CBG/ABG or is pt clinically deteriorating / can't stabilize airway	5	0	
- pt could improve with alternate airway / CPAP/ hood/ facemask	2	0	
- stable airway i.e. intubated/ oxy hood / CPAP/facemask/ nasal cannula	1	0	
BREATHING: Difficult to ventilate/oxygenate / No resp effort or impending resp failure	5	0	
- severe stridor/wheezing i.e. asthma score > 5 with altered mental status	5	0	
CIRCULATION: Abnormal rhythm or heart rate with unstable BP	4	0	
- unstable CHD/ or PICE dependent lesion	3	0	
- potential for dysrhythmia (ingestions, heart block, heart anomaly, etc.)	3	0	
- BP unstable requiring vasopressors and multiple volume expanders	4	0	
DELIVERY: impending delivery of newborn with no OB/PEDS service available	5	0	
NEUROLOGIC: GCS < 9	3	0	
- head bleed with altered mental status/ significant closed head injury/mass effe	3	0	
- actively seizing	3	0	
EXCEPTIONS:			
- is the treatment provided by team and/or accepting facility. TIME SENSITIVE. (immediate need for surgery, vascular compromise, rapid deterioration)	9	0	
total score			
TRANSPORT ASSESSMENT	YES	NO	
- available to fly	1	0	
- ETA of Helicopter > 25 min	0	1	
- is distance to refer hosp/clinic > 60 min drive	2	0	
- traffic conditions			
- mild	0	0	
- moderate	2	0	
- heavy / rush hour / road construction	3	0	
- referring MD requesting team to fly	10	0	
GLENNON PEDIATRICIAN / NEONATOLOGY PRESENT AT OSH	-2	0	
TRANSPORT TEAM AVAILABILITY			
- only one team available for transport without back up (Cape team always gets 1)	1	0	
TOTAL SCORE			
- score of 1 to 5: no flight, drive			
- score of 6 to 9: consider flight or drive			
- score of 10 and above			
	flight	drive	

RESULTS

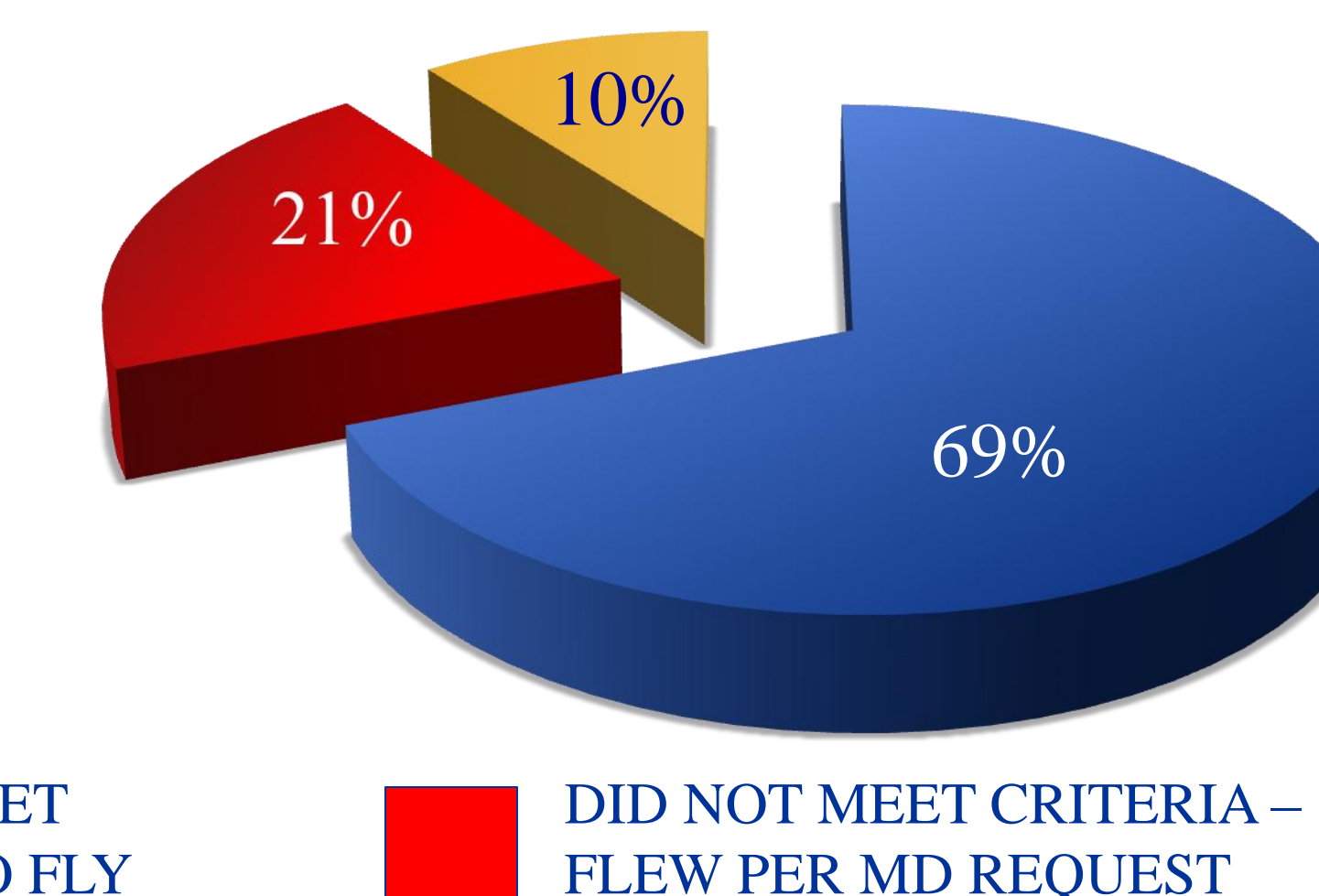
- We had 1087 trips in the 2011-12 period and 1222 trips in the 2012-13 period. We flew for 23% and 20%, respectively.
- In 2011-12, there were 67% pediatric flights and 33% neonatal trips.
- In 2012-13, there were 62% pediatric flights and 38% neonatal trips.
- Of the flights that did not meet criteria, about 2/3 were pediatric and 1/3 were neonatal.
- We had adequate data to evaluate 234 of 252 flights (93%) from 2011-12 and 233 of 249 flights (94%) from 2012-13.
- The percent of flights that did not meet criteria to fly was not significantly changed despite implementation of a flight tool (33% retrospective vs. 31% prospective, p=0.51).
- Of the flights that did not meet criteria to fly, we flew 67% of the time for physician request, in the prospective year. The remainder occurred for multiple, undefined reasons, as determined by the transport RN and accepting physician in real time.

RESULTS

RETROSPECTIVE USE OF FLIGHT TOOL
234 flights in 2011-12



PROSPECTIVE USE OF FLIGHT TOOL
233 flights in 2012-13



The percent of flights not meeting criteria to fly did not change after implementation of our flight criteria tool. Of the flights not meeting criteria, 2/3 of the time we flew per MD request.

CONCLUSION

- Application of pre-determined flight criteria did not change the number of times flight was chosen as the mode of transport.
- Two-thirds of the flights that did not meet criteria to fly traveled by air due to referring physician request.
- Further studies will help elucidate whether our tool is underestimating the need for flight, or if we need to provide education to referral centers on use of air transport services.

DISCUSSION

- We found poor compliance with completion of our flight tool - 292 sheets completed out of 1222 trips (remaining data gathered from chart review). It is possible that the tool was only utilized if flight was considered.
- We plan to re-evaluate our tool for future use and simplify the scoring system by making "physician request" a Yes/No question, rather than a numeric value.
- If a tool or set of criteria is used to determine mode of transport, it must be concise and considered standard practice by all team members.
- Outreach education for referring physicians may improve the utility of any pre-determined criteria intended to assist in the selection of mode of transport.
- Future studies are needed to evaluate the utility of pre-determined flight criteria.

CONTACT

Laura Cerny, MD • 1465 South Grand Blvd, St. Louis, MO 63104 • lcerny@slu.edu