

LifeFlow®

VOLUME RESUSCITATION. WHEN MINUTES MATTER.





Transforming Resuscitation

- Early resuscitation in patients with shock and hypotension improves outcomes
- LifeFlow provides rapid and controlled fluid delivery when minutes matter
- FDA cleared for crystalloid & blood
- > 13,000 patient uses in hospitals, EMS, air medical, military
- Designed to:
 - Reverse shock quickly and efficiently
 - Improve bundle compliance (ie SEP-1)
 - Reduce cost of care & hospital LOS
 - Reduce provider stress

LifeFlow

An easy-to-use, hand-held device for rapid & controlled delivery of blood or fluids in patients with shock from conditions such as

- *Trauma*
- *Sepsis*
- *Cardiac arrest*
- *Anaphylaxis*
- *Peri-intubation hypotension*



LifeFlow Benefits



For critically ill patients with hypotension or shock...

Quick precise bolus to confirm volume responsiveness. Rapidly titrate as needed.

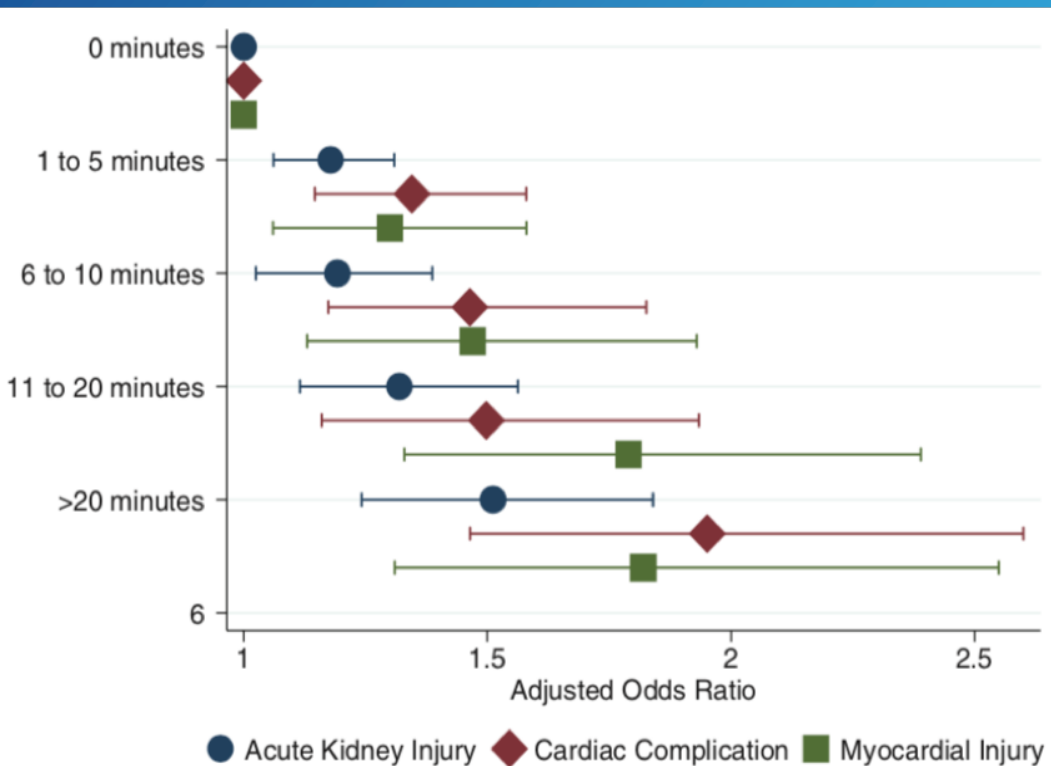
Improve patient outcomes & reduce interventions & LOS

Improve ED flow & time to diagnosis/treatment

Reduce complexity and staff training

Reduce stress & perceived workload

Persistent Shock = Worse Patient Outcomes



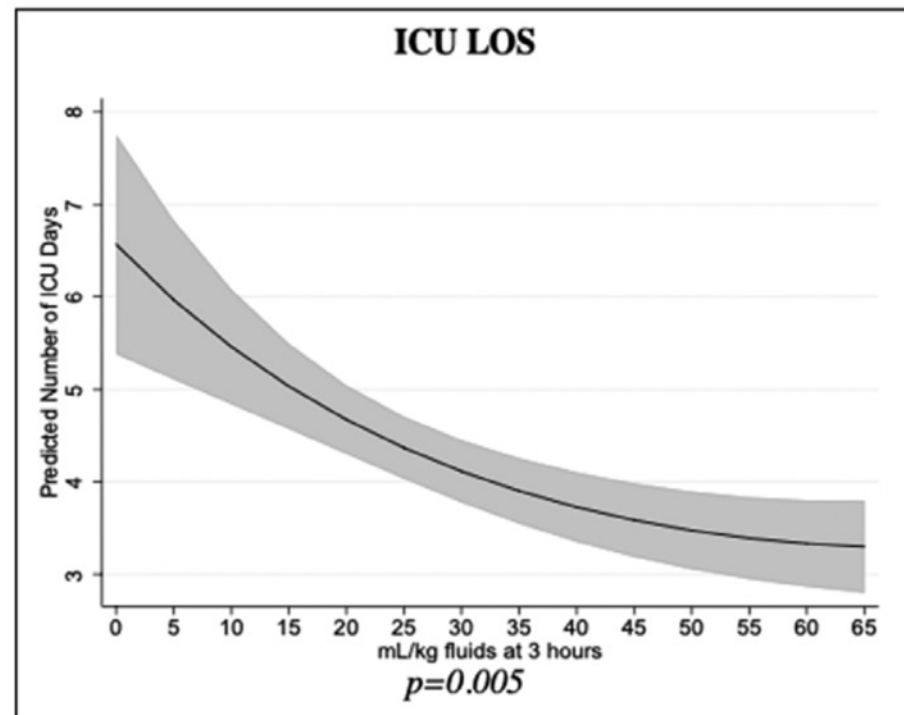
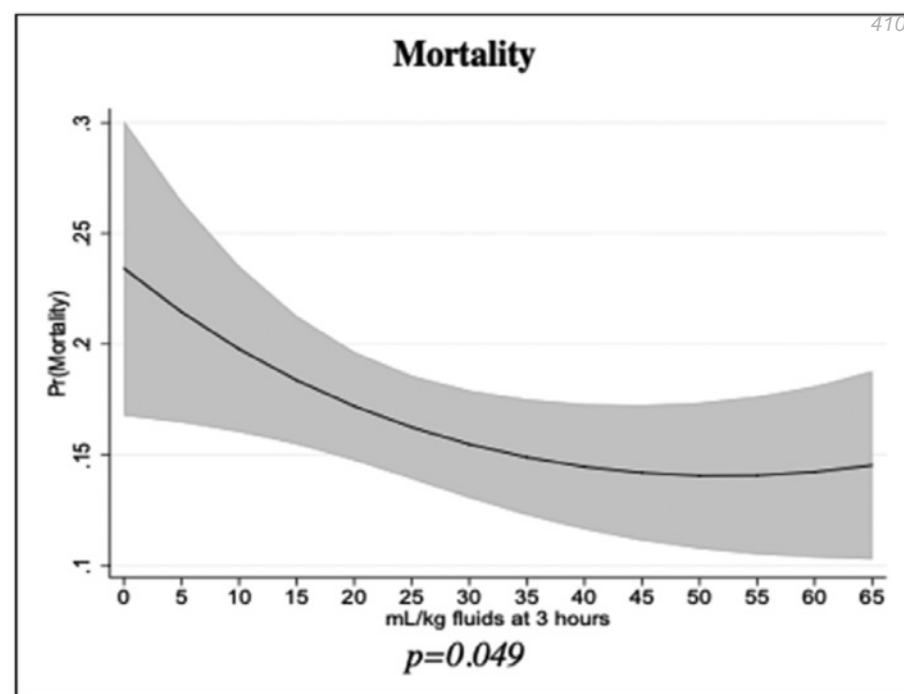
Walsh, Anesthesiology 2013

Delayed fluid resuscitation in septic shock patients increases risk of organ injury & death

- Every minute of delay in severe hemorrhage leads to worse outcomes
- Single episode of SBP < 100 in ED predicts 3x mortality in sepsis
- Each minute < MAP 65 in sepsis patients increases mortality
- Single episode of hypotension increases TBI mortality
- Hypotension is the biggest risk factor for peri-intubation cardiac arrest

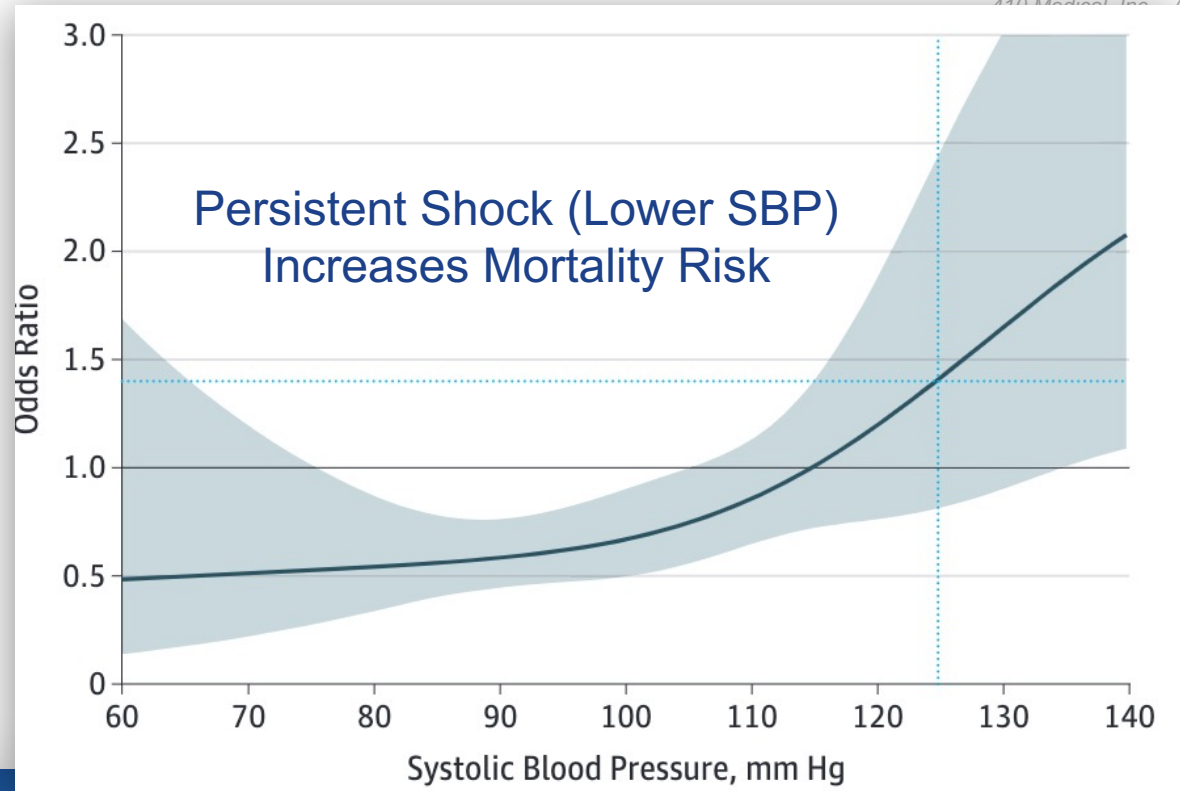
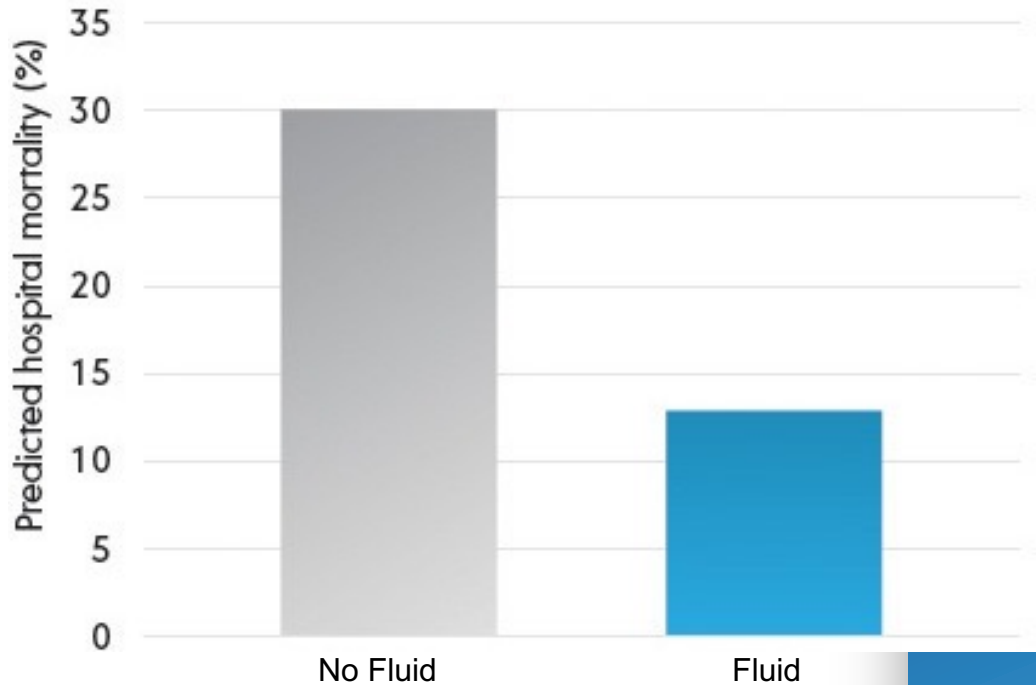
Earlier Resuscitation Saves Lives

- Numerous studies support early fluid resuscitation in septic shock
- Patients with septic shock who receive 30ml/kg in 3 hours had lower mortality, lower ICU LOS, lower risk of intubation in the ED
- This is particularly true for patients considered at-risk for fluid overload: elderly, obese, CHF, ESRD



EMS & Sepsis

Prehospital Fluids in Hypotensive Patients Significantly Improves Outcomes



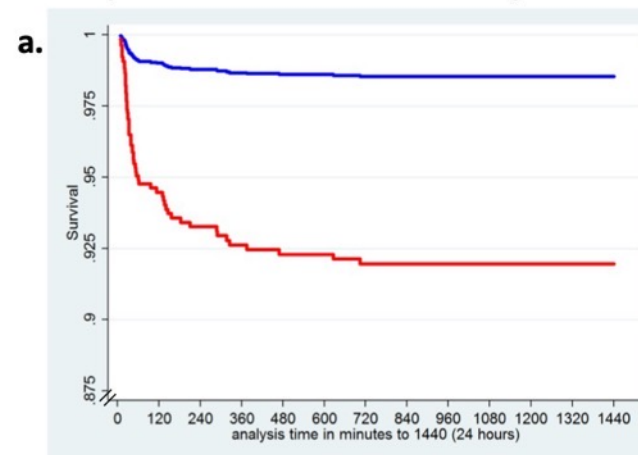
- Earlier fluid resuscitation improves mortality in pre-hospital septic shock
- Greatest benefit in hypotensive patients

Medevac: Early Transfusion Saves Lives

- Hemorrhage is the #1 cause of preventable trauma death
- Every minute of delay in initiation of transfusion increases mortality
- Standard rapid infusers are often not available in the early minutes of care

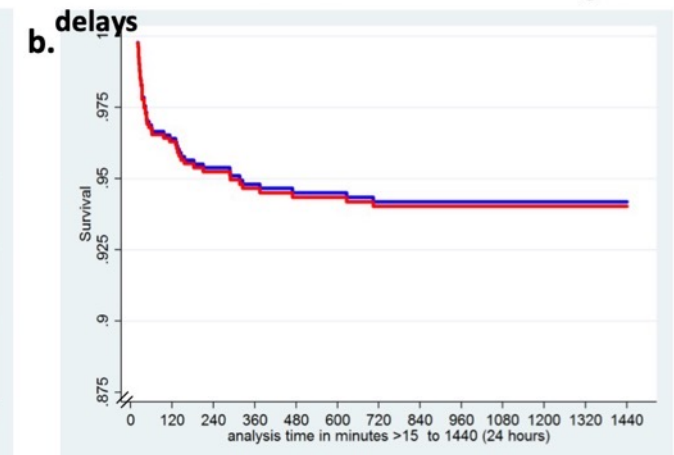
Early Transfusion, Pre- or In-Hospital Adjusted Cox Proportional Hazards Models for 24 hour Survival

Transfusion within 15* minutes vs. longer delays after MEDEVAC rescue from point of



HR = 0.17 (95% CI = 0.04 – 0.73, $P=0.017$)

Conditional survival among 16-minute survivors:
Transfusion within 16-20 minutes vs. longer



HR = 0.94 (95% CI = 0.41 – 2.17, $P=0.887$)

Earlier transfusion ———
Delayed transfusion ———

*Within a median of 36 minutes after injury occurrence (IQR 27,46)

Limitations of Traditional Infusion Methods

- Gravity and infusion pumps are slow
- Pressure bags are imprecise
- Rapid infusers are complex and require significant staff training
- Pressure bags and rapid infusers work poorly with small gauge vascular access

Watch this LifeFlow versus pressure bag comparison video of flow in a cadaver model. [Click here.](#)



IV Pump



Pressure Bag



Powered Rapid Infuser

LifeFlow PLUS: Improving Resuscitation

Fast

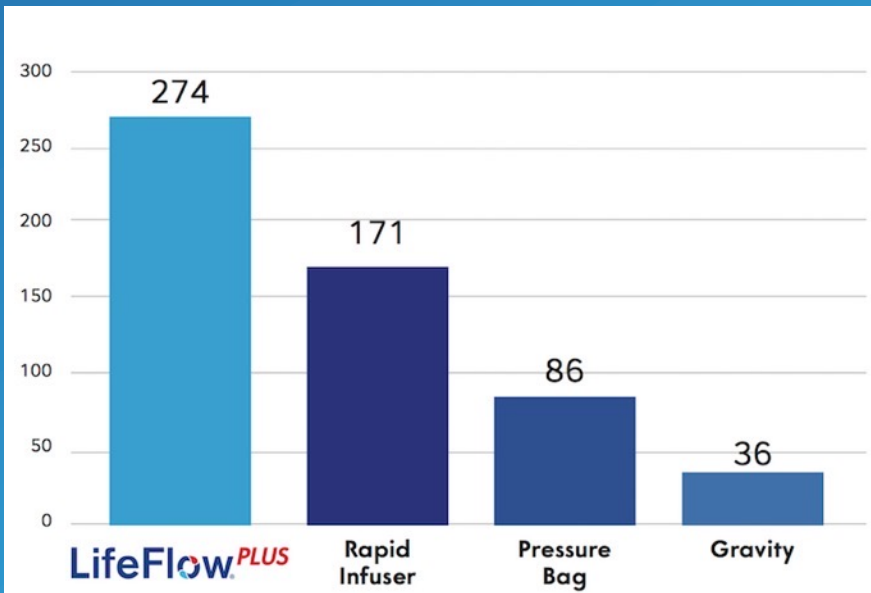
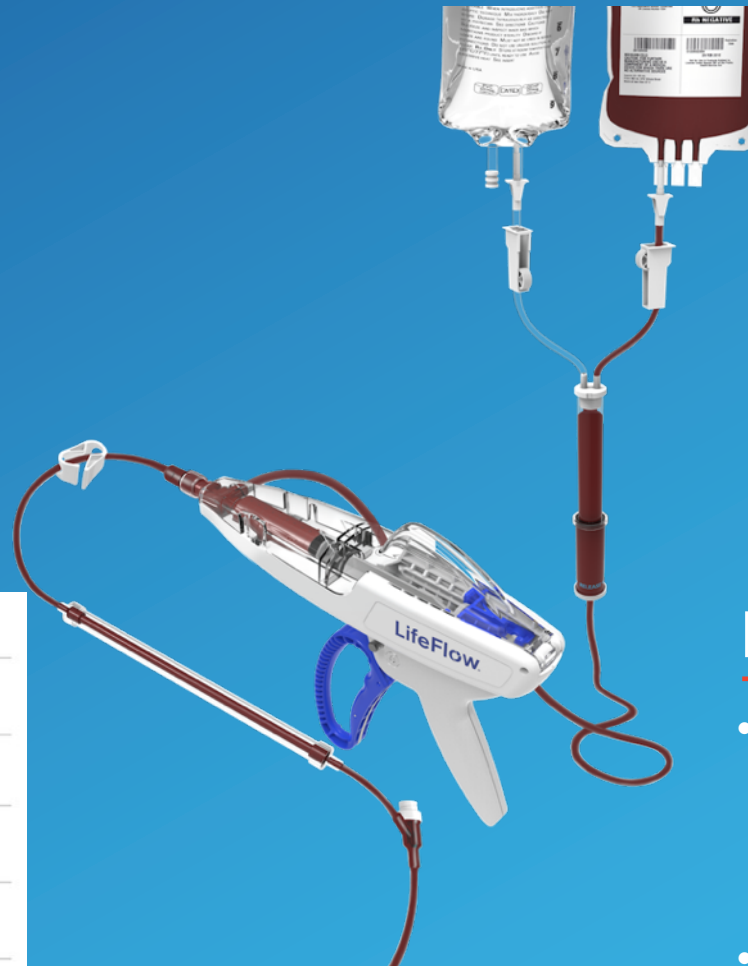
- Set up and ready for use in less than 3 minutes by a new user
- Transfuse one unit of PRBC's or 500mL of fluids in less than 2 minutes.
- *3-10x faster than pressure bags*

Convenient

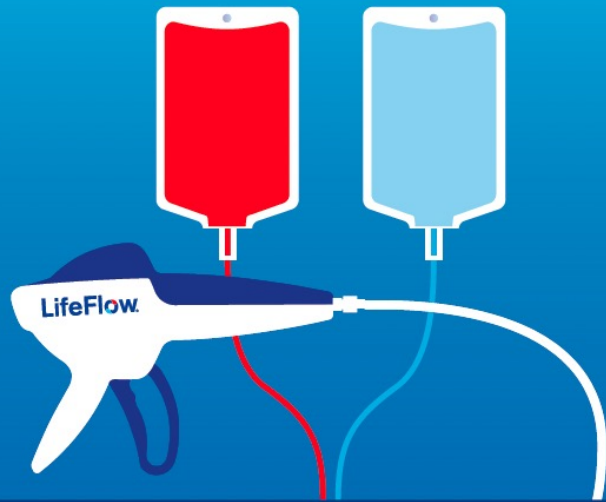
- Light and portable for use in any environment
- One-handed operation

Reduced Risk

- AirCheck™ reduces risk of air embolism compared to pressure bag
- Closed system reduces contamination risk vs push-pull.



Data w/ 18ga catheter. Data on file with 410 Medical.



RESUSCITATE

Quickly and easily infuse
blood or fluid bolus

- Set up <2 minutes
- Deliver a unit of blood or 500ml fluid <2 minutes
- Stabilize the patient



REASSESS

Assess patient response
to infusion

- Monitor perfusion
- Evaluate changes in vital signs and level of consciousness

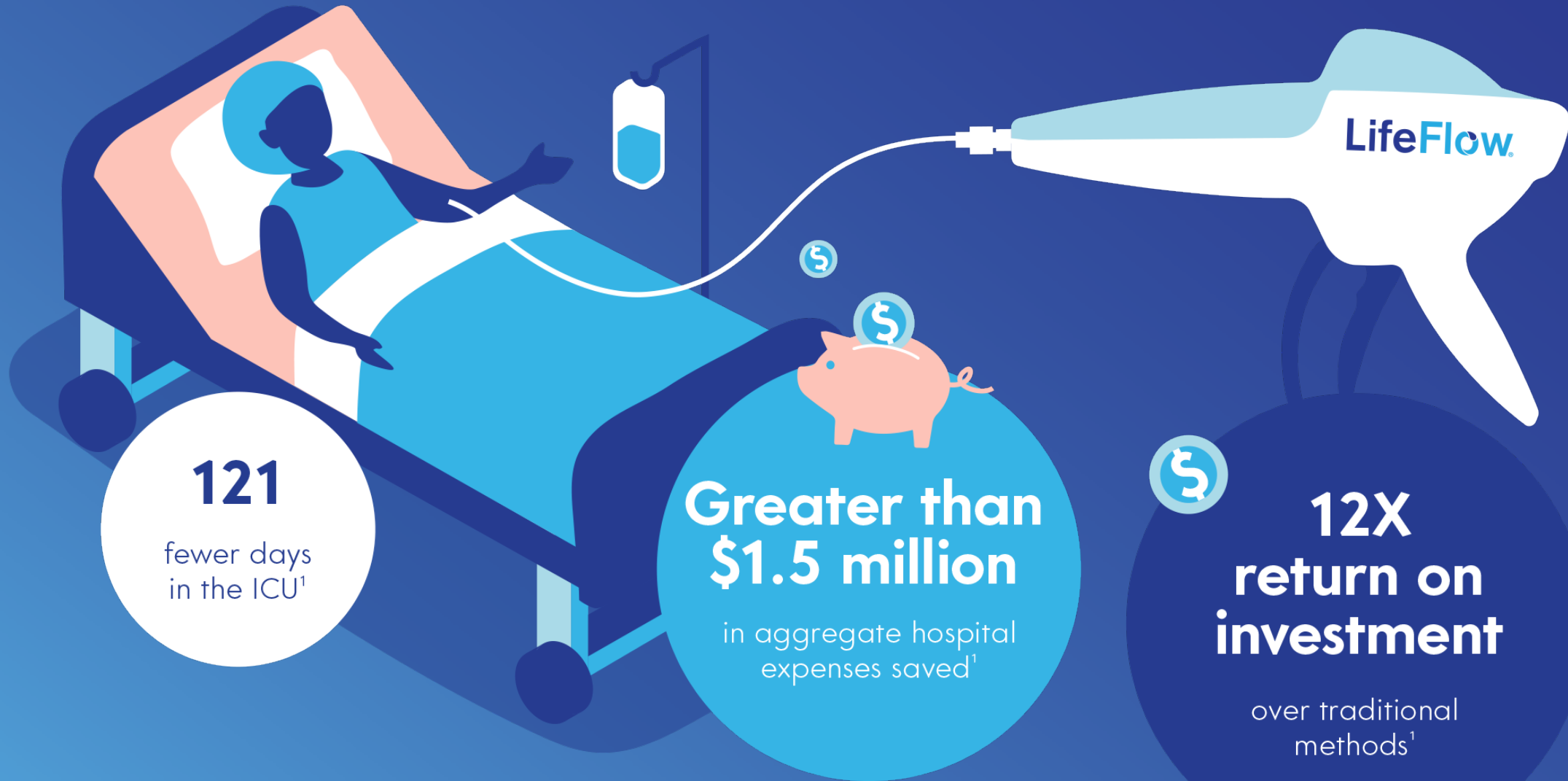


REDUCE

Reduce interventions
& time to disposition

- Make diagnosis and treatment decisions faster
- Reduce mechanical ventilation

Potential Economic Impact in Adult Shock per 500 patients



1. Brooks EA, et al. (Oct 2018). *Open Acc Emerg Med.* 10:165-170.

Reduce Provider Task-load & Stress

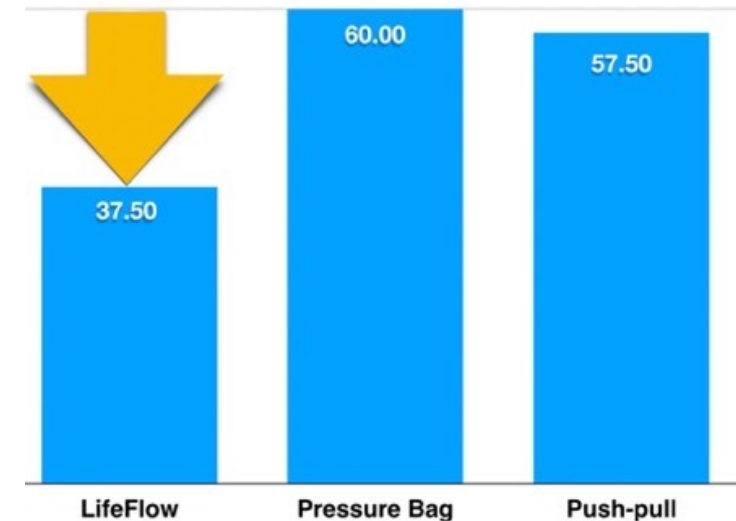


Caring for emergent patients can be stressful, especially for new nurses. New LifeFlow users can be trained and proficient in minutes.

- Reduce team stress
- Improve satisfaction

“LifeFlow is easy to set up and use, even in the stress of an emergency. I love having control of exactly how much fluid I am giving.”
- Lisa Collins, RN

Mental Demand Score of Simulated Resuscitation of Patient in Decompensated Shock

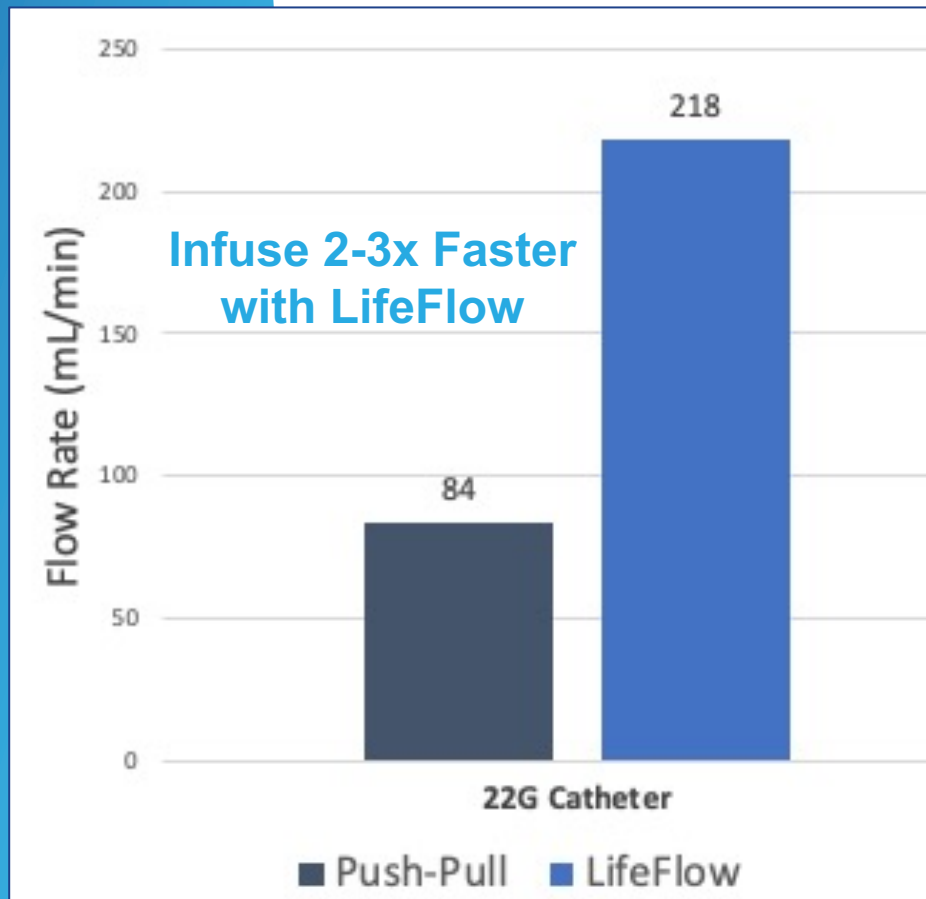


Up to 38% lower mental demand with LifeFlow over pressure bag and push-pull

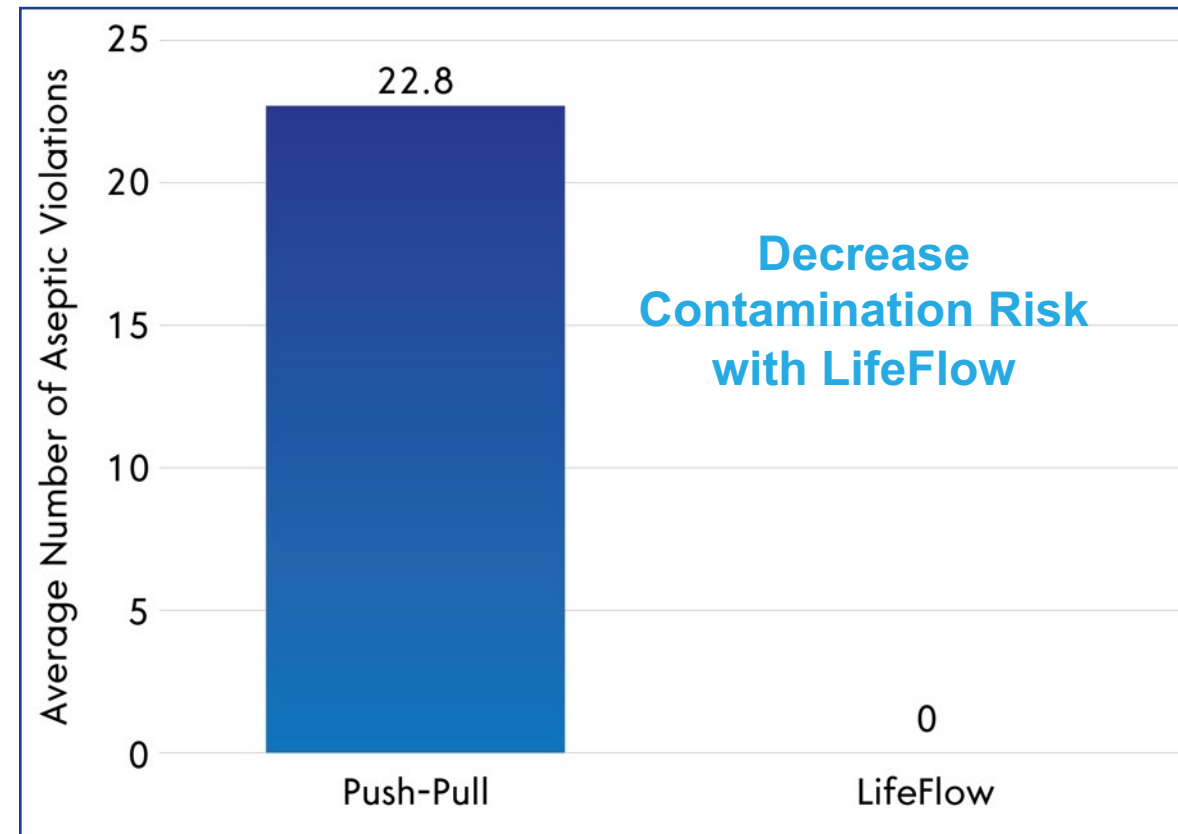
LifeFlow in Pediatrics



*Push-pull
Method*



Aseptic Violations in a Study Comparing Push-Pull to LifeFlow when Administering a 500ml Fluid Bolus



Spangler, Journal of Infusion Nursing 2019

[Experiment Video: Fluorescein and Push-Pull Contamination](#)

LifeFlow Clinical Evidence

Case Series: LifeFlow PLUS for Management of Severe Hemorrhagic Shock. 410 Medical White Paper. 2021.

Piehl, Mark; James, Elaine; De Maio, Valerie 1252: Targeted Fluids for Pediatric Sepsis in a Community-Based Children's Hospital, Critical Care Medicine: January 2021 - Volume 49 - Issue 1 - p 631

Piehl M, Smith-Ramsey C, Teeter WA. Improving fluid resuscitation in pediatric shock with LifeFlow®: a retrospective case series and review of the literature. *Open Access Emerg Med.* 2019;11:87-93.

Spangler, Hillary MD; Piehl, Mark MD, MPH; Lane, Andrew MS, BS; Robertson, Galen MSME, BSME Improving Aseptic Technique During the Treatment of Pediatric Septic Shock, Journal of Infusion Nursing: January/February 2019 - Volume 42 - Issue 1 - p 23-28

Brooks EA, Piehl M. Potential mortality and cost reduction in adult severe sepsis and septic shock through the use of an innovative fluid delivery device. *Open Access Emerg Med.* 2018



View all LifeFlow publications here: www.410medical.com/publications

LifeFlow

LifeFlow in Action

>13,000 uses

>120 installations (hospital & EMS)

Adult and pediatric

Awards & Recognition

- Premier Breakthrough Innovation
- Frost & Sullivan Fluid Resuscitation Entrepreneurial Company of 2021
- JEMS Hot Product



LifeFlow[®] PLUS

Blood & Fluid Infuser

www.410medical.com



Watch the LifeFlow PLUS training video!



MK-0051.5 Rev B

