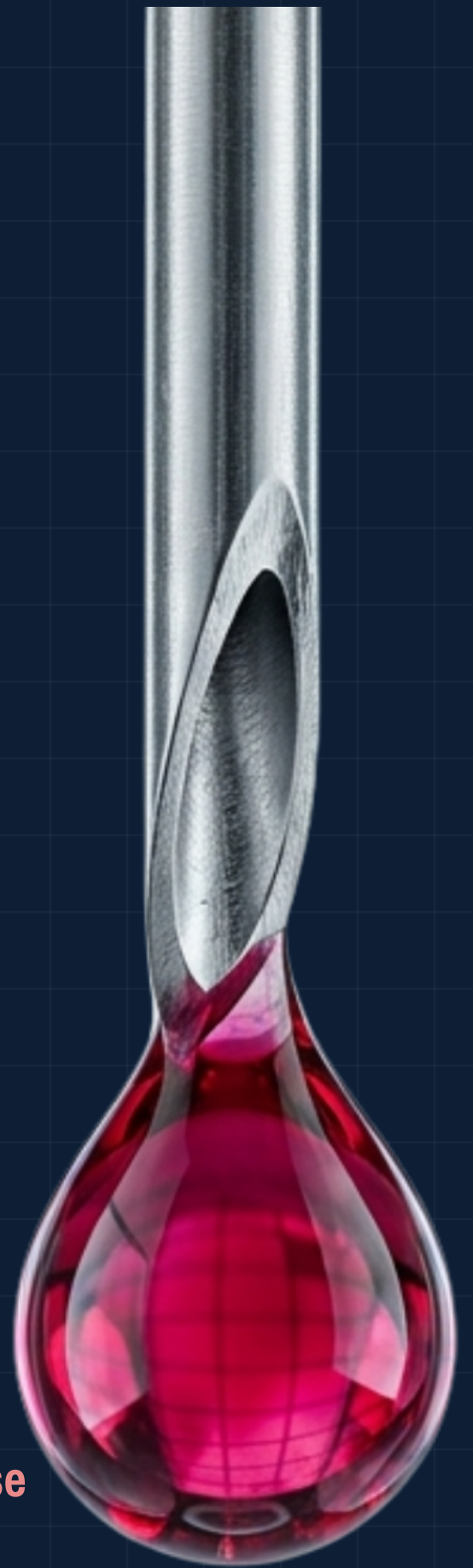


The Narrow Margin

*The invisible physics of neonatal
infusion.*

Why absolute precision in **dilution** —
not just the prescribed dose — is the
line between the therapeutic target and **hemodynamic collapse**



1 DROP • 1 DECISION

Based on: Brunton LL, Chabner BA, Knollmann BC (eds.). *Goodman & Gilman's The Pharmacological Basis of Therapeutics*, 12th ed. Artmed, 2012.

SWIPE →

Getting the dose right is only **half the job.**

THE MYTH

"If the total milligrams are correct, the patient is safe."

Dose (mg/kg) × Weight (kg) = a safe prescription

× NOT QUITE

THE REALITY

The right dose does not guarantee the right concentration.

Dilution and reconstitution guidelines are what stand between the prescription and the complication.

The drug's journey has 3 critical failure zones.

01 The syringe — measurement error

Microscale volumes are physically impossible to draw up with precision. Fractionating 0.05 mL is not a skill problem — it is a physics problem.

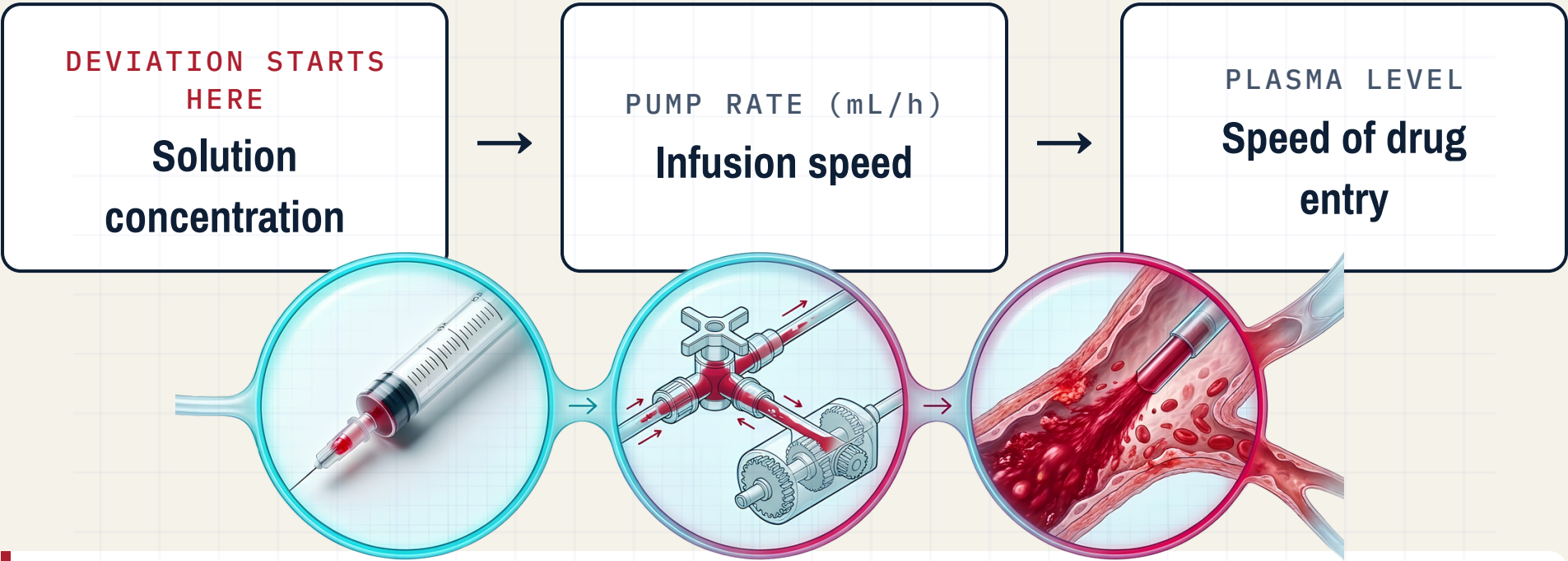
02 The line & the pump — drift and dead space

Drug silently accumulates in plastic connectors, and tiny pump variations are amplified by every extra mcg/mL of concentration.

03 The vessel — local toxicity

A concentrated bolus meets a bloodstream too small to dilute it: kinetic shock, with no immediate buffering in neonatal flow.

In continuous infusion, concentration sets the speed.



Ignore the manufacturer's dilution and the neonate gets **fluid overload** (over-diluted solution) or **fulminant toxicity** (over-concentrated solution).

The neonatal therapeutic window



↑ *In a neonate, the safe window is this narrow.*

Dexmedetomidine

Precedex® – central $\alpha 2$ -adrenergic agonist

WHY IT'S USED

Deep sedation, amnesia and analgesia — without significant respiratory depression.

THE DANGER OF VARIATION

Its central $\alpha 2$ action blocks the compensatory cardiovascular reflexes the neonate depends on.

THE CLINICAL DISASTER

An over-concentrated solution precipitates an exaggerated sympathetic block: immediate marked bradycardia and profound hypotension.

FDA LABEL

Dilute to **4 mcg/mL** before administration.

PRECEDEX Injection, 200 mcg/2 mL (100 mcg/mL)

PRECEDEX must be diluted with 0.9% sodium chloride injection to achieve required concentration (4 mcg/mL) prior to administration. Preparation of solutions is the same, whether for the loading dose or maintenance infusion.

To prepare the infusion, withdraw 2 mL of PRECEDEX Injection, and add to 48 mL of 0.9% sodium chloride injection to a total of 50 mL. Shake gently to mix well.

PRECEDEX in 0.9% Sodium Chloride Injection, 80 mcg/20 mL (4 mcg/mL), 200 mcg/50 mL (4 mcg/mL), 400 mcg/100 mL (4 mcg/mL), and 1,000 mcg/250 mL (4 mcg/mL)

PRECEDEX in 0.9% Sodium Chloride Injection is supplied in glass containers containing a premixed, ready to use dexmedetomidine hydrochloride solution in 0.9% sodium chloride in water. No further dilution of these preparations is necessary.

2.5 Administration with Other Fluids

PRECEDEX infusion should not be co-administered through the same intravenous catheter with blood or plasma because physical compatibility has not been established.

✓ In NeoFast, a hyperconcentrated Precedex infusion is simply not selectable.

neofast

Medicação Contínua

Dexmedetomidina (Precedex®)

EV contínuo

100mcg/mL

Peso (Kg)

2

Dose desejada (mcg/kg/h)

1

Dose sugerida: 0,2 a 1,5mcg/kg/h

Gotejamento pretendido (mL/h)

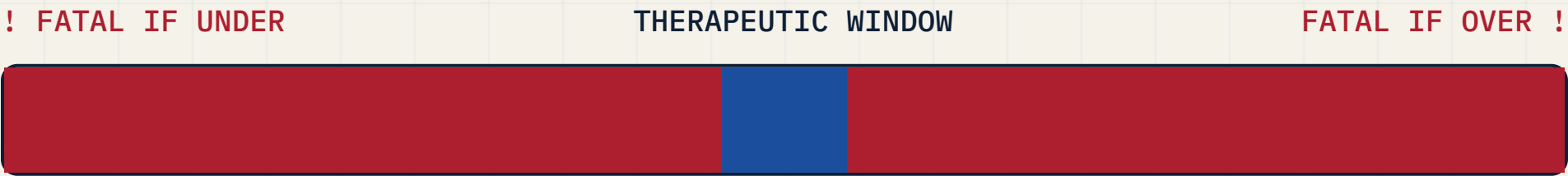
0,1

Gotejamento mínimo de 0,5 mL/h para dose 1mcg/kg/h para uma concentração adequada de até 4mcg/mL

THE LABEL, APPLIED –
LIVE IN THE APP

Alprostadil (PGE1)

Prostin® – keeps the ductus arteriosus open in duct-dependent congenital heart disease



The only safe ground is that sliver in the middle — deviation kills in both directions.

OVER-DILUTED

Subtherapeutic dose

Rapid ductal closure → acute hypoxemia, circulatory shock and immediate death.

OVER-CONCENTRATED

Abrupt systemic hit

Extreme vasodilation → refractory hypotension, severe apnea and circulatory collapse.

ANATOMY OF THE COLLAPSE

Local concentration peak in the vessel → massive arrival at endothelial receptors → sudden apnea & severe hypotension

The vasoactives: where concentration rewrites the receptor.

Dobutamine

β 1-selective agonist

Inotropic support without a big rise in myocardial O₂ demand. **Over-concentrated:** severe tachycardia, critical O₂ demand, arrhythmias — and rapid receptor down-regulation.

Epinephrine

α & β – dose-dependent

At low concentration, β 2 vasodilation predominates. **Over-concentrated:** α vasoconstriction takes over — extreme systolic hypertension and lethal arrhythmias.

Norepinephrine

predominantly α 1

A vasoconstrictor of extreme potency. **Over-concentrated:** abrupt BP surge with reflex vagal bradycardia; extravasation causes severe local tissue necrosis.

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Continuous medication

Dobutamine

IV - central access

IV - peripheral access

12.5mg/mL

Weight (kg)

2

Desired dose (mcg/kg/min)

10

Suggested dose: 2 to 25 mcg/kg/min

Intended drip (mL/h)

0.5

Minimum drip of 0.6 mL/h for 10mcg/kg/min for an adequate concentration of up to 2mg/mL

Additional information

Bibliographical references

Please note: the information presented in this application is taken from bibliographical references and is for information purposes only. The doctor is solely responsible for prescribing, administering and making the necessary adjustments. This app does not replace medical guidelines or clinical judgment.

DOBUTAMINE CEILING,
ENFORCED IN NEOFAST

*The neonate's body reacts violently
to any unplanned plasma peak.*

Where the software draws the line.

neofast

Continuous medication

Alprostadil (Prostin® and Prostavasin®)

IV continuous

500mcg/mL Solution10mcg/mL Powder

20mcg/mL Powder

No Fluid RestrictionFluid restriction

Weight (kg)

2

Desired dose (mcg/kg/min)

0.01

Suggested dose: 0.01 to 0.4 mcg/kg/min

Intended drip (mL/h)

0.1

Minimum drip of 0.12 mL/h for 0.01mcg/kg/min for an adequate concentration of up to 10mcg/mL

BLOCKED · TOO CONCENTRATED

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Continuous medication

Alprostadil (Prostin® and Prostavasin®)

IV continuous

500mcg/mL Solution10mcg/mL Powder

20mcg/mL Powder

No Fluid RestrictionFluid restriction

Weight (kg)

2

Desired dose (mcg/kg/min)

0.01

Suggested dose: 0.01 to 0.4 mcg/kg/min

Intended drip (mL/h)

0.2

Alprostadil (Prostin® and Prostavasi...

IV continuous - 500mcg/mL Solution

Dose	0.06mL
Dilute with NS	4.74mL
Final concentration	6 mcg/mL
Total in 24 hours	4.8mL

References for every calculation

SAFE · WITHIN THE CEILING

Every rate is checked against a **safe concentration ceiling** — hyperconcentration is never allowed, and the safe minimum drip is flagged for you.

The pharmacological telemetry matrix

DRUG	RECEPTOR	OVER-CONCENTRATION RISK	OVER-DILUTION RISK
Epinephrine	α , β	Arrhythmias · extreme hypertension	Fluid overload
Dexmedetomidine	$\alpha 2$	Profound bradycardia	Fluid overload
Dobutamine	$\beta 1$	Tachycardia · O ₂ demand	Fluid overload
Norepinephrine	$\alpha 1$	Necrosis · vagal reflex	Fluid overload
Alprostadil	smooth muscle	Circulatory collapse · apnea	Ductal closure — death

Every drug punishes deviation differently — the protocol is the only common defense.

Validate the concentration

Dilution is never a suggestion — it fixes the mechanical infusion rate to the neonate's physiology. Follow the manufacturer's specification strictly.

Monitor hemodynamics

Tachycardia, reflex bradycardia or sudden hypotension are often the first signs of a dilution error — not of the underlying disease.

Respect the physiology

Small distribution volume, immature clearance: the error an adult tolerates is fatal in a NICU.

Pharmacological precision isn't just math. It's the definitive protection of the neonatal cardiovascular system.

neofast

Safe neonatal infusions, referenced calculation
by calculation.

Get NeoFast → [link in bio](#)

@neofastapp · iOS & Android

REFERENCE

BRUNTON, Laurence L.; CHABNER, Bruce A.; KNOLLMANN, Björn C. (Eds.). *Goodman & Gilman's The Pharmacological Basis of Therapeutics*. 12th ed. Porto Alegre: Artmed, 2012. · Precedex® FDA label (dexmedetomidine hydrochloride).