

## HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use SMOFLIPID safely and effectively. See [full prescribing information for SMOFLIPID](#).

SMOFLIPID (lipid injectable emulsion), for intravenous use  
Initial U.S. Approval: 2016

### WARNING: DEATH IN PRETERM INFANTS

See [full prescribing information for complete boxed warning](#).

- Deaths in preterm infants have been reported in literature. (5.1, 8.4)
- Autopsy findings included intravascular fat accumulation in the lungs. (5.1, 8.4)
- Preterm and low-birth-weight infants have poor clearance of intravenous lipid emulsion and increased free fatty acid plasma levels following lipid emulsion infusion. (5.1, 8.4)

### INDICATIONS AND USAGE

Smoflipid is indicated in adults as a source of calories and essential fatty acids for parenteral nutrition when oral or enteral nutrition is not possible, insufficient, or contraindicated. (1)

### Limitations of Use

The omega-6: omega-3 fatty acid ratio and Medium Chain Triglycerides in Smoflipid have not been shown to improve clinical outcomes compared to other intravenous lipid emulsions. (1)

### DOSAGE AND ADMINISTRATION

- For intravenous infusion only into a peripheral or central vein. (2.1)
- Recommended dosage depends on age, energy expenditure, clinical status, body weight, tolerance, ability to metabolize, and consideration of additional energy given to the patient. (2.4)
- The usual daily dosage in adults is 1 to 2 grams/kg per day and should not exceed 2.5 grams/kg per day (2.4)

### DOSAGE FORMS AND STRENGTHS

Smoflipid is a lipid injectable emulsion with a lipid content of 0.2 grams/mL in 100 mL, 250 mL, and 500 mL. (3)

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### CONTRAINDICATIONS

- Known hypersensitivity to fish, egg, soybean, or peanut protein, or to any of the active ingredients or excipients. (4)
- Severe hyperlipidemia or severe disorders of lipid metabolism with serum triglycerides > 1,000 mg/dL. (4, 5.8)

### WARNINGS AND PRECAUTIONS

- **Hypersensitivity Reactions:** Monitor for signs or symptoms. Discontinue infusion if reactions occur. (5.2)
- **Infection, Fat Overload, Hypertriglyceridemia, and Refeeding Complications:** Monitor for signs and symptoms; monitor laboratory parameters. (5.3, 5.4, 5.5, 5.8)
- **Aluminum Toxicity:** Increased risk in patients with renal impairment, including preterm infants. (5.6, 8.4)
- **Parenteral Nutrition-Associated Liver Disease:** Increased risk in patients who receive parenteral nutrition for extended periods of time, especially preterm infants. Monitor liver function tests, if abnormalities occur consider discontinuation or dosage reduction. (5.7, 8.4)

### ADVERSE REACTIONS

Most common adverse drug reactions (>1%) from clinical trials were nausea, vomiting, hyperglycemia, flatulence, pyrexia, abdominal pain, increased blood triglycerides, hypertension, sepsis, dyspepsia, urinary tract infection, anemia and device related infection. (6.1)

To report SUSPECTED ADVERSE REACTIONS, contact Fresenius Kabi Vigilance & Medical Affairs at 1-800-551-7176 or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

### DRUG INTERACTIONS

Coumarin and Coumarin Derivatives, Including Warfarin: Anticoagulant activity may be counteracted; monitor laboratory parameters. (7.1)

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Revised: 05/2016

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\* Sections or subsections omitted from the full prescribing information are not listed.

## 1 FULL PRESCRIBING INFORMATION

### WARNING: DEATH IN PRETERM INFANTS

- Deaths in preterm infants after infusion of intravenous lipid emulsions have been reported in the medical literature.
- Autopsy findings included intravascular fat accumulation in the lungs.
- Preterm infants and low-birth-weight infants have poor clearance of intravenous lipid emulsion and increased free fatty acid plasma levels following lipid emulsion infusion.

*[See Warnings and Precautions (5.1) and Use in Specific Populations (8.4)]*

## 2 1 INDICATIONS AND USAGE

3 Smoflipid is indicated in adults as a source of calories and essential fatty acids for parenteral  
4 nutrition when oral or enteral nutrition is not possible, insufficient, or contraindicated.

### 5 Limitations of Use

6 The omega-6: omega-3 fatty acid ratio and Medium Chain Triglycerides in Smoflipid have  
7 not been shown to improve clinical outcomes compared to other intravenous lipid emulsions  
8 *[See Clinical Studies (14)].*

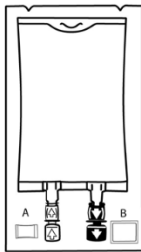
## 9 2 DOSAGE AND ADMINISTRATION

### 10 2.1 Administration Instructions

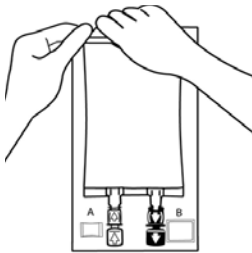
- 11 • Smoflipid is for central or peripheral intravenous infusion. When administered with  
12 dextrose and amino acids, the choice of a central or peripheral venous route should  
13 depend on the osmolarity of the final infusate. Solutions with osmolarity of  
14  $\geq 900$  mOsm/L must be infused through a central vein.
- 15 • Use a 1.2 micron in-line filter.
- 16 • Use a dedicated line for parenteral nutrition (PN). Smoflipid can be infused concurrently  
17 into the same vein as dextrose-amino acid solutions (as part of PN) by a Y-connector  
18 located near the infusion site; flow rates of each solution should be controlled separately  
19 by infusion pumps.
- 20 • To prevent air embolism, use a non-vented infusion set or close the vent on a vented set,  
21 avoid multiple connections, do not connect flexible bags in series, fully evacuate  
22 residual gas in the bag prior to administration, do not pressurize the flexible bag to

- 1 increase flow rates, and if administration is controlled by a pumping device, turn off  
2 pump before the bag runs dry.
- 3 • Do not use administration sets and lines that contain di-2-ethylhexyl phthalate (DEHP).  
4 Administration sets that contain polyvinyl chloride (PVC) components have DEHP as a  
5 plasticizer.

## 6 2.2 Instructions for Use

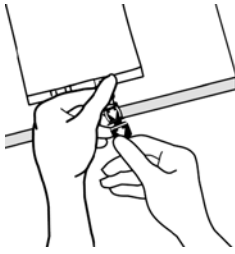


1. Inspect the integrity indicator (Oxalert<sup>®</sup>) (A) before removing the overpouch. Discard the product if the indicator is black.



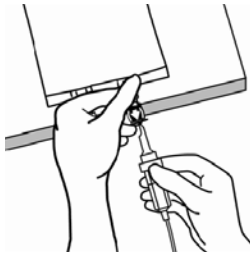
2. Place the bag on a clean, flat surface. Remove the overpouch by tearing at the notch and pulling down along the container. The Oxalert sachet (A) and the oxygen absorber (B) should be discarded.

Inspect the bag and contents prior to administration. Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit. Inspect Smoflipid to ensure that the emulsion has not separated. The lipid emulsion should be a homogenous liquid with a milky appearance. Discard the bag if there appears to be a phase separation of the emulsion, or if any signs of discoloration, particulates, and/or leakage are observed.

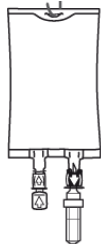


3. Break off the BLUE infusion port cap with the arrow pointing away from the bag.

NOTE: Choose a nonvented infusion set or close the air vent on a vented set. Follow the instructions for use for the infusion set. Use infusion sets (according to ISO Number 8536-4) with an external spike diameter of 5.5 to 5.7 mm. Use a 1.2 micron in-line filter during administration.



4. Hold the base of the infusion port. Insert the spike through the infusion port by rotating your wrist slightly until the spike is inserted.



5. Hang the bag using the hanger cut and start infusion.

For Single Use Only

Discard unused portion.

- 1
  - 2
  - 3
- After removing the overpouch, Smoflipid should be used immediately. If not used immediately, the product should not be stored longer than 24 hours at 2° to 8°C (36° to 46°F). After removal from storage, the emulsion should be infused within 24 hours.

### 4 2.3 Admixing Instructions

- 5
  - 6
  - 7
- Prepare the admixture in PN containers using strict aseptic techniques to avoid microbial contamination.
  - Do not add Smoflipid to the PN container first; destabilization of the lipid may occur.

- 1 • Smoflipid may be mixed with amino acid and dextrose injections to produce “all-in-one”  
2 PN admixtures. The following proper mixing sequence must be followed to minimize  
3 pH-related problems by ensuring that typically acidic dextrose injections are not mixed  
4 with lipid emulsions alone:

- 5 1. Transfer dextrose injection to the PN container.  
6 2. Transfer amino acid injection.  
7 3. Transfer Smoflipid.

8 Simultaneous transfer of amino acid injection, dextrose injection, and Smoflipid to  
9 the PN container is also permitted. Use gentle agitation during admixing to minimize  
10 localized concentration effects; shake bags gently after each addition.

- 11 • Do not inject additives directly into Smoflipid.  
12 • Additions to the PN admixtures should be evaluated by a pharmacist for compatibility.  
13 Questions about compatibility may be directed to Fresenius Kabi Vigilance & Medical  
14 Affairs. If it is deemed advisable to introduce additives, use strict aseptic techniques to  
15 avoid microbial contamination.  
16 • The prime destabilizers of emulsions are excessive acidity (such as a pH < 5) and  
17 inappropriate electrolyte content. Amino acid solutions exert buffering effects that  
18 protect the emulsion from destabilization. Give careful consideration to the addition of  
19 divalent cations (Ca<sup>++</sup> and Mg<sup>++</sup>), which have been shown to cause emulsion instability.  
20 • Parenteral drug products should be inspected visually for particulate matter and  
21 discoloration prior to administration, whenever solution and container permit. Inspect  
22 the admixture to ensure that:  
23 ○ precipitates have not formed during preparation of the admixture, and  
24 ○ the emulsion has not separated. Separation of the emulsion can be visibly  
25 identified by a yellowish streaking or the accumulation of yellowish droplets in  
26 the admixed emulsion.

27 Discard the admixture if any of these are observed.

- 28 • The remaining contents of a partly used bag must be discarded.  
29 • Infuse admixtures containing Smoflipid immediately. Admixtures should be used  
30 promptly with storage under refrigeration at 2° to 8°C (36° to 46°F) not to exceed

1 24 hours and must be infused completely within 24 hours after removal from  
2 refrigeration.

## 3 **2.4 Adult Dosing Information**

- 4 • The dosing of Smoflipid depends on the patient's individual energy requirements  
5 influenced by age, body weight, tolerance, clinical status, and the ability to eliminate  
6 and metabolize lipids.
- 7 • When determining dose, energy supplied by dextrose and amino acids from PN, as well  
8 as energy from oral or enteral nutrition, has to be taken into account. Energy and lipid  
9 provided from lipid-based medications should also be taken into account  
10 (e.g., propofol).
- 11 • Prior to administration of Smoflipid, correct severe fluid and electrolyte disorders.
- 12 • Smoflipid contains 0.163 to 0.225 mg/mL of all-rac- $\alpha$ -tocopherol. The daily US  
13 recommended dietary allowance (RDA) in adults for  $\alpha$ -tocopherol (Vitamin E) is 15 mg.  
14 Take into account the amount of  $\alpha$ -tocopherol in Smoflipid when determining the need  
15 for additional supplementation.

### 16 Recommended Adult Dosing

- 17 • The recommended dosage of Smoflipid for adult patients is 1 to 2 grams/kg per day and  
18 should not exceed 2.5 grams/kg per day.<sup>1</sup> The initial rate of infusion should be  
19 0.5 mL/min for the first 15 to 30 minutes of infusion. If tolerated, gradually increase  
20 until reaching the required rate after 30 minutes. Maximum infusion rate should not  
21 exceed 0.5 mL/kg/hour. The daily dose should also not exceed a maximum of 60% of  
22 total energy requirements [*see Overdosage (10)*].
- 23 • The recommended duration of infusion for Smoflipid is between 12 and 24 hours,  
24 depending on the clinical situation. The administration flow rate is determined by  
25 dividing the volume of lipid by the duration of the infusion.
- 26 • Before starting the infusion, determine serum triglyceride levels to establish the baseline  
27 value. In patients with elevated triglyceride levels, initiate Smoflipid at a lower dosage  
28 and advance in smaller increments, monitoring the triglyceride levels with each  
29 adjustment [*see Warnings and Precautions (5.8, 5.9)*].

30

### 1    **3    DOSAGE FORMS AND STRENGTHS**

2    Smoflipid is a lipid injectable emulsion with a lipid content of 0.2 g/mL available in  
3    100 mL, 250 mL, and 500 mL.

### 4    **4    CONTRAINDICATIONS**

5    Use of Smoflipid is contraindicated in patients with:

- 6    • Known hypersensitivity to fish, egg, soybean, or peanut protein, or to any of the active  
7    ingredients or excipients, or
- 8    • Severe hyperlipidemia or severe disorders of lipid metabolism characterized by  
9    hypertriglyceridemia (serum triglyceride concentrations > 1,000 mg/dL) [*see Warnings*  
10    *and Precautions (5.8)*]

### 11    **5    WARNINGS AND PRECAUTIONS**

#### 12    **5.1    Death in Preterm Infants**

13    Deaths after infusion of soybean-based intravenous lipid emulsions have been reported in  
14    preterm infants. Autopsy findings included intravascular lipid accumulation in the lungs.  
15    Preterm and small-for-gestational-age infants have poor clearance of intravenous lipid  
16    emulsion and increased free fatty acid plasma levels following lipid emulsion infusion. The  
17    safe and effective use of Smoflipid in pediatric patients, including preterm infants, has not been  
18    established.

#### 19    **5.2    Hypersensitivity Reactions**

20    Smoflipid contains soybean oil, fish oil, and egg phospholipids, which may cause  
21    hypersensitivity reactions. Cross reactions have been observed between soybean and peanut  
22    oil. Signs or symptoms of a hypersensitivity reaction may include: tachypnea, dyspnea,  
23    hypoxia, bronchospasm, tachycardia, hypotension, cyanosis, vomiting, nausea, headache,  
24    sweating, dizziness, altered mentation, flushing, rash, urticaria, erythema, pyrexia, or chills.  
25    If a hypersensitivity reaction occurs, stop infusion of Smoflipid immediately and undertake  
26    appropriate treatment and supportive measures.

#### 27    **5.3    Risk of Catheter-Related Infections**

28    Lipid emulsions, such as Smoflipid, can support microbial growth and is an independent risk

1 factor for the development of catheter-related bloodstream infections. The risk of infection is  
2 increased in patients with malnutrition-associated immunosuppression, long-term use and  
3 poor maintenance of intravenous catheters, or immunosuppressive effects of other  
4 concomitant conditions or drugs.

5 To decrease the risk of infectious complications, ensure aseptic techniques in catheter  
6 placement, catheter maintenance, and preparation and administration of Smoflipid. Monitor  
7 for signs and symptoms (fever and chills) of early infections, including laboratory test  
8 results that might indicate infection (including leukocytosis and hyperglycemia), and  
9 frequently checks of the parenteral access device and insertion site for edema, redness, and  
10 discharge.

#### 11 **5.4 Fat Overload Syndrome**

12 Fat overload syndrome is a rare condition that has been reported with intravenous lipid  
13 emulsions. A reduced or limited ability to metabolize lipids accompanied by prolonged  
14 plasma clearance may result in a syndrome characterized by a sudden deterioration in the  
15 patient's condition including fever, anemia, leukopenia, thrombocytopenia, coagulation  
16 disorders, hyperlipidemia, liver fatty infiltration (hepatomegaly), deteriorating liver  
17 function, and central nervous system manifestations (e.g., coma). The cause of the fat  
18 overload syndrome is unclear. Although it has been most frequently observed when the  
19 recommended lipid dose was exceeded, cases have also been described where the lipid  
20 formulation was administered according to instructions. The syndrome is usually reversible  
21 when the infusion of the lipid emulsion is stopped.

#### 22 **5.5 Refeeding Syndrome**

23 Refeeding severely undernourished patients with PN may result in the refeeding syndrome,  
24 characterized by the intracellular shift of potassium, phosphorus, and magnesium as the  
25 patient becomes anabolic. Thiamine deficiency and fluid retention may also develop. To  
26 prevent these complications, monitor severely undernourished patients and slowly increase  
27 their nutrient intakes.

#### 28 **5.6 Aluminum Toxicity**

29 Smoflipid contains no more than 25 mcg/L of aluminum. However, with prolonged PN  
30 administration in patients with renal impairment, the aluminum levels in the patient may



1 reach toxic levels. Preterm infants are at greater risk because their kidneys are immature,  
2 and they require large amounts of calcium and phosphate solutions, which contain  
3 aluminum.

4 Patients with renal impairment, including preterm infants, who receive parenteral levels of  
5 aluminum at greater than 4 to 5 mcg/kg/day accumulate aluminum to levels associated with  
6 central nervous system and bone toxicity. Tissue loading may occur at even lower rates of  
7 administration of PN products.

### 8 **5.7 Risk of Parenteral Nutrition-Associated Liver Disease**

9 Parenteral nutrition-associated liver disease (PNALD) has been reported in patients who  
10 receive PN for extended periods of time, especially preterm infants, and can present as  
11 cholestasis or steatohepatitis. The exact etiology is unknown and is likely multifactorial.  
12 Intravenously administered phytosterols (plant sterols) contained in plant-derived lipid  
13 formulations have been associated with development of PNALD, although a causal  
14 relationship has not been established.

15 If Smoflipid-treated patients develop liver test abnormalities, consider discontinuation or  
16 dose reduction.

### 17 **5.8 Hypertriglyceridemia**

18 Impaired lipid metabolism with hypertriglyceridemia may occur in conditions such as  
19 inherited lipid disorders, obesity, diabetes mellitus, and metabolic syndrome.

20 To evaluate the patient's capacity to eliminate and metabolize the infused lipid emulsion,  
21 measure serum triglycerides before the start of infusion (baseline value), at the time of each  
22 increase in dosage, and regularly throughout treatment.

23 In adult patients with levels > 400 mg/dL, reduce the dose of Smoflipid and monitor serum  
24 triglyceride levels to avoid the clinical consequences associated with hypertriglyceridemia.  
25 Serum triglyceride levels > 1,000 mg/dL, have been associated with an increased risk of  
26 pancreatitis.

### 27 **5.9 Monitoring/Laboratory Tests**

#### 28 Routine Monitoring

29 Monitor serum triglycerides [*see Warnings and Precautions (5.8)*], fluid and electrolyte

1 status, blood glucose, liver and kidney function, blood count including platelets, and  
2 coagulation parameters throughout treatment.

### 3 Essential Fatty Acids

4 Monitoring patients for signs and symptoms of essential fatty acid deficiency (EFAD) is  
5 recommended. Laboratory tests are available to determine serum fatty acids levels.  
6 Reference values should be consulted to help determine adequacy of essential fatty acid  
7 status. Increasing essential fatty acid intake (enterally or parenterally) is effective in treating  
8 and preventing EFAD.

9 In Smoflipid, the mean concentration of linoleic acid (an omega-6 essential fatty acid) is  
10 35 mg/mL (range 28 to 50 mg/mL), and  $\alpha$ -linolenic acid (an omega-3 essential fatty acid) is  
11 4.5 mg/mL (range 3 to 7 mg/mL). There are insufficient long-term data to determine whether  
12 Smoflipid can supply essential fatty acids in adequate amounts in patients who may have  
13 increased requirements.

#### 14 **5.10 Interference with Laboratory Tests**

15 Content of vitamin K may counteract anticoagulant activity [*see Drug Interactions (7.1)*].  
16 The lipids contained in this emulsion may interfere with some laboratory blood tests  
17 (e.g., hemoglobin, lactate dehydrogenase [LDH], bilirubin, and oxygen saturation) if blood  
18 is sampled before lipids have cleared from the bloodstream. Lipids are normally cleared  
19 after a period of 5 to 6 hours once the lipid infusion is stopped.

## 20 **6 ADVERSE REACTIONS**

21 Adverse reactions described elsewhere in labeling:

- 22 • Death in Preterm Infants [*see Warnings and Precautions (5.1)*]
- 23 • Hypersensitivity Reactions [*see Warnings and Precautions (5.2)*]
- 24 • Risk of Catheter-Related Infections [*see Warnings and Precautions (5.3)*]
- 25 • Fat Overload Syndrome [*see Warnings and Precautions (5.4)*]
- 26 • Refeeding Syndrome [*see Warnings and Precautions (5.5)*]
- 27 • Aluminum Toxicity [*see Warnings and Precautions (5.6)*]
- 28 • Risk of Parenteral Nutrition-Associated Liver Disease [*see Warnings and Precautions*  
29 (*5.7*)]

- Hypertriglyceridemia [see Warnings and Precautions (5.8)]

## 6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be compared to rates in the clinical trials of another drug and may not reflect the rates observed in clinical practice.

The safety database for Smoflipid reflects exposure in 229 patients exposed for 5 days to 4 weeks in 5 clinical trials. The pooled population exposed to Smoflipid was adult patients up to 89 years old (20 to 89 years of age), 43% female, and 99% Caucasian. The most frequently reported medical histories in the Smoflipid group were surgical and medical procedures (84%), neoplasms (57%), gastrointestinal disorders (53%), vascular disorders (37%), and infections and infestations (20%).

Smoflipid was used as a component of PN which also included dextrose, amino acids, vitamins, and trace elements. Two of the 5 studies were performed with Smoflipid as a component of PN delivered in a 3-chamber bag.

Adverse reactions occurring in at least 1% of patients who received Smoflipid are shown in Table 2.

**Table 2: Adverse Reactions in > 1% of Patients Treated with Smoflipid**

<b>Adverse Reaction</b>	<b>Number of Patients in Smoflipid Group (N=229)</b>	<b>Number of Patients in Comparator Group (N=230)</b>
Nausea	20 (9%)	26 (11%)
Vomiting	15 (7%)	12 (5%)
Hyperglycemia	12 (5%)	5 (2%)
Flatulence	10 (4%)	4 (2%)
Pyrexia	9 (4%)	11 (5%)
Abdominal pain	8 (4%)	5 (2%)
Blood triglycerides increased	6 (3%)	4 (2%)
Hypertension	6 (3%)	9 (4%)
Sepsis	5 (2%)	4 (2%)
Dyspepsia	5 (2%)	1 (0%)
Urinary tract infection	4 (2%)	3 (1%)
Anemia	4 (2%)	2 (1%)
Device related infection	4 (2%)	2 (1%)

1 Less common adverse reactions in  $\leq 1\%$  of patients who received Smoflipid were dyspnea,  
2 leukocytosis, diarrhea, pneumonia, cholestasis, dysgeusia, increased blood alkaline  
3 phosphatase, increased gamma-glutamyltransferase, increased C-reactive protein,  
4 tachycardia, liver function test abnormalities, headache, pruritis, dizziness, rash and  
5 thrombophlebitis.

## 6 **6.2 Postmarketing Experience**

7 The following adverse reactions have been identified during post-approval use of Smoflipid  
8 in countries where it is registered. Because these reactions are reported voluntarily from a  
9 population of uncertain size, it is not always possible to reliably estimate their frequency or  
10 establish a causal relationship to product exposure.

11 *Infections and Infestations:* infection

12 *Respiratory, Thoracic and Mediastinal Disorders:* dyspnea

## 13 **7 DRUG INTERACTIONS**

### 14 **7.1 Coumarin and Coumarin Derivatives**

15 No drug interaction studies have been performed with Smoflipid.

16 Soybean oil and olive oil have a natural content of vitamin K<sub>1</sub> that may counteract the  
17 anticoagulant activity of coumarin and coumarin derivatives including warfarin. Monitor  
18 laboratory parameters for anticoagulant activity in patients who are on both Smoflipid 20%  
19 and coumarin or coumarin derivatives.

## 20 **8 USE IN SPECIFIC POPULATIONS**

### 21 **8.1 Pregnancy**

#### 22 Risk Summary

23 There are no available data on risks associated with Smoflipid when used in pregnant  
24 women. Animal reproduction studies have not been conducted with Smoflipid. It is not  
25 known whether Smoflipid can cause fetal harm when administered to a pregnant woman.  
26 Consider the benefits and risks of Smoflipid when prescribing to a pregnant woman. In the  
27 US general population, the estimated background risk of major birth defects and miscarriage  
28 in clinically recognized pregnancies is 2% to 4% and 15% to 20%, respectively.

## 1 Clinical Considerations

### 2 *Disease-associated maternal and/or embryo/fetal risk*

3 Severe malnutrition in a pregnant woman is associated with preterm delivery, low birth  
4 weight, intrauterine growth restriction, congenital malformations, and perinatal mortality.  
5 Parenteral nutrition should be considered if the pregnant woman's nutritional requirements  
6 cannot be fulfilled by oral or enteral intake.

## 7 **8.2 Lactation**

### 8 Risk summary

9 No data are available regarding the presence of Smoflipid in human milk, the effects on the  
10 breast fed infant, or the effects on milk production. The developmental and health benefits  
11 of breastfeeding should be considered along with the mother's clinical need for Smoflipid,  
12 and any potential adverse effects on the breastfed infant from Smoflipid, or from the  
13 underlying maternal condition.

## 14 **8.4 Pediatric Use**

15 The safety and effectiveness of Smoflipid have not been established in pediatric patients.  
16 Deaths in preterm infants after infusion of intravenous lipid emulsion have been reported  
17 [*see Warnings and Precautions (5.1)*]. Because of immature renal function, preterm infants  
18 receiving prolonged treatment with Smoflipid may be at risk of aluminum toxicity [*see*  
19 *Warnings and Precautions (5.6)*]. Patients, including pediatric patients, may be at risk for  
20 PNALD [*see Warnings and Precautions (5.6)*].

21 There are insufficient data from pediatric studies to establish that Smoflipid injection  
22 provides sufficient amounts of essential fatty acids (EFA) in pediatric patients. Pediatric  
23 patients may be particularly vulnerable to neurologic complications due to EFA deficiency if  
24 adequate amounts of EFA are not provided [*see Warnings and Precautions (5.9)*]. In  
25 clinical trials of a soybean oil-based intravenous lipid emulsion product, thrombocytopenia  
26 in neonates occurred (less than 1%). Smoflipid contains soybean oil (30% of total lipids).

## 27 **8.5 Geriatric Use**

28 Energy expenditure and requirements may be lower for older adults than younger patients.  
29 Of the 354 patients in clinical studies of Smoflipid, 35% were > 65 years of age and 10%

1 were > 75 years of age. No overall differences in the safety and efficacy of Smoflipid were  
2 observed between these patients and younger patients, and other reported clinical experience  
3 has not identified differences in responses between the elderly and younger patients, but  
4 greater sensitivity in some older patients cannot be ruled out.

## 5 **8.6 Hepatic Impairment**

6 Parenteral nutrition should be used with caution in patients with hepatic impairment.  
7 Hepatobiliary disorders are known to develop in some patients without preexisting liver  
8 disease who receive parenteral nutrition, including cholestasis, hepatic steatosis, fibrosis and  
9 cirrhosis (parenteral nutrition associated liver disease), possibly leading to hepatic failure.  
10 Cholecystitis and cholelithiasis have also been observed. The etiology of these disorders is  
11 thought to be multifactorial and may differ between patients.

12 Monitor liver function parameters closely. Patients developing signs of hepatobiliary  
13 disorders should be assessed early by a clinician knowledgeable in liver diseases in order to  
14 identify causative and contributory factors, and possible therapeutic and prophylactic  
15 interventions.

## 16 **10 OVERDOSAGE**

17 In the event of an overdose, fat overload syndrome may occur [*see Warnings and*  
18 *Precautions (5.4)*]. Stop the Smoflipid infusion until triglyceride levels have normalized.  
19 The effects are usually reversible by stopping the lipid infusion. If medically appropriate,  
20 further intervention may be indicated. Lipids are not dialyzable from serum.

## 21 **11 DESCRIPTION**

22 Smoflipid is a sterile, nonpyrogenic, white, homogenous lipid emulsion for intravenous  
23 infusion. The lipid content of Smoflipid is 0.20 g/mL, and comprises a mixture of soybean  
24 oil, medium-chain triglycerides (MCTs), olive oil, and fish oil. The mean essential fatty acid  
25 content of Smoflipid is 35 mg/mL (range of 28 to 50 mg/mL) linoleic acid (omega-6) and  
26 4.5 mg/mL (range of 3 to 7 mg/mL)  $\alpha$ -linolenic acid (omega-3). The phosphate content is  
27 15 mmol/L.

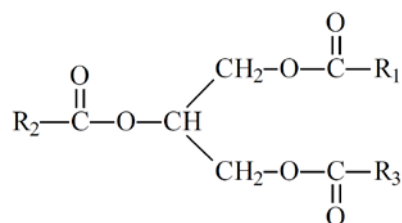
28 The total energy content, including fat, phospholipids, and glycerol is 2,000 kcal/L.

29 Each 100 mL of Smoflipid contains approximately 6 g soybean oil, 6 g MCT, 5 g olive oil,

1 3 g fish oil, 1.2 g egg phospholipids, 2.5 g glycerin, 16.3 to 22.5 mg all-*rac*- $\alpha$ -tocopherol,  
2 0.3 g sodium oleate, water for injection, and sodium hydroxide for pH adjustment  
3 (pH 6 to 9).

4 Smoflipid has an osmolality of approximately 380 mOsm/kg water (which represents an  
5 osmolality of 270 mOsm/L).

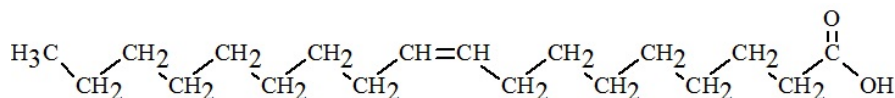
6 The oils included in Smoflipid consist of a mixture of triglycerides of predominantly  
7 unsaturated fatty acids with the following structure:



8  
9 where  $\text{R}_1\text{C}(=\text{O})-$ ,  $\text{R}_2\text{C}(=\text{O})-$ , and  $\text{R}_3\text{C}(=\text{O})-$  are saturated and unsaturated fatty acid residues. The  
10 major components of the fatty acids in Smoflipid are oleic acid (23% to 35%), linoleic acid  
11 (14% to 25%), caprylic acid (13% to 24%), palmitic acid (7% to 12%), capric acid (5% to  
12 15%), stearic acid (1.5% to 4%),  $\alpha$ -linolenic acid (1.5% to 3.5%), eicosapentaenoic acid  
13 (EPA; 1% to 3.5%), and docosahexaenoic acid (DHA; 1% to 3.5%).

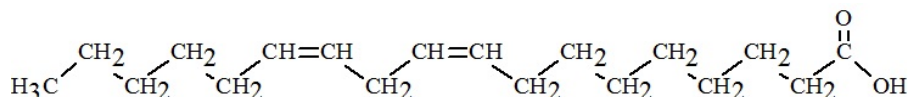
**Oleic Acid**

$\text{C}_{18}\text{H}_{34}\text{O}_2$



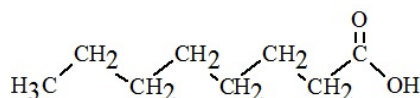
**Linoleic Acid**

$\text{C}_{18}\text{H}_{32}\text{O}_2$



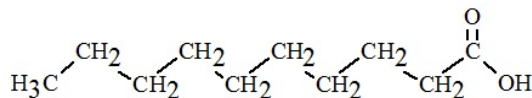
**Caprylic Acid**

$\text{C}_8\text{H}_{16}\text{O}_2$



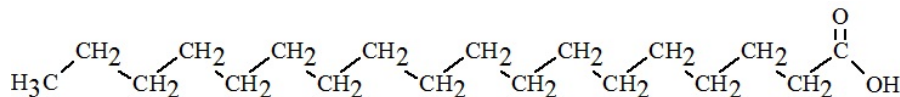
**Capric Acid**

$\text{C}_{10}\text{H}_{20}\text{O}_2$



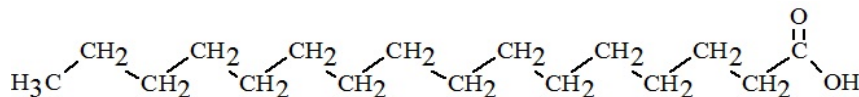
**Stearic Acid**

$\text{C}_{18}\text{H}_{36}\text{O}_2$



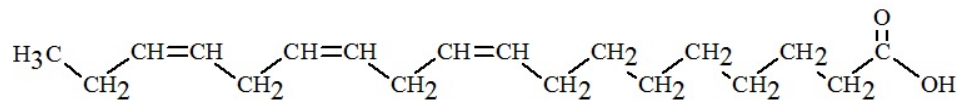
**Palmitic Acid**

$\text{C}_{16}\text{H}_{32}\text{O}_2$



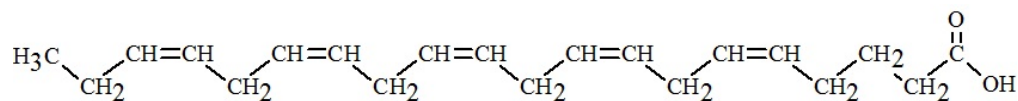
**Linolenic  
Acid**

$C_{18}H_{30}O_2$



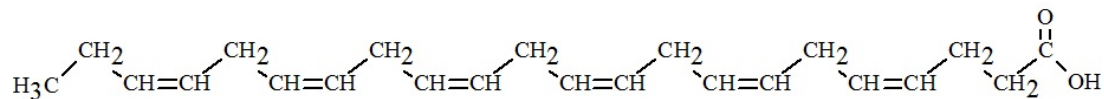
**EPA**

$C_{20}H_{30}O_2$



**DHA**

$C_{22}H_{32}O_2$



1 Smoflipid contains no more than 25 mcg/L of aluminum.

2 The container is not made with natural rubber latex, PVC, or DEHP.

3 **12 CLINICAL PHARMACOLOGY**

4 **12.1 Mechanism of Action**

5 Smoflipid administered intravenously provides a biologically utilizable source of calories  
6 and essential fatty acids.

7 Fatty acids serve as an important substrate for energy production. The most common  
8 mechanism of action for energy production derived from fatty acid metabolism is beta  
9 oxidation. Fatty acids are also important for membrane structure and function, precursors for  
10 bioactive molecules (such as prostaglandins), and as regulators of gene expression.

11 Smoflipid causes an increase in heat production, decrease in respiratory quotient, and  
12 increase in oxygen consumption following its administration.

13 **13 NONCLINICAL TOXICOLOGY**

14 **13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility**

15 Studies with Smoflipid have not been performed to evaluate the carcinogenic potential or  
16 effects on fertility.

17 No mutagenic effects were observed in the following *in vitro* studies with Smoflipid:  
18 bacterial gene mutation assay in *Salmonella typhimurium*, chromosomal aberration assay in  
19 human lymphocytes, and hypoxanthine phosphoribosyl transferase (HPRT) gene mutation  
20 assay in V79 cells.



1 In an *in vivo* bone marrow cytogenic study in rats, no mutagenic effect was observed.

## 2 **14 CLINICAL STUDIES**

3 The efficacy of Smoflipid compared to soybean oil lipid emulsions was evaluated in three  
4 clinical trials. Of the 354 patients treated in these studies, (176 Smoflipid; 178 comparator),  
5 62% were male, 99% were Caucasian, and ages ranged from 19 to 96 years. All patients  
6 received Smoflipid or the comparator as part of a PN regimen. Although Study 1, Study 2,  
7 and Study 3 were not adequately designed to demonstrate noninferiority of Smoflipid to the  
8 soybean oil comparator, they support Smoflipid as a source of calories and essential fatty  
9 acids in adults. The lipid dosage was variable in these studies and adjusted to the patient's  
10 nutritional requirements. Nutritional efficacy was assessed by biomarkers of lipid  
11 metabolism, anthropometric indices (body weight, height, body mass index [BMI]), and/or  
12 biomarkers of protein metabolism (albumin) and mean changes in fatty acid parameters.

13 Study 1 was a double-blind, randomized, active-controlled, parallel-group, multicenter study  
14 in patients who required PN for at least 28 days. Seventy-five patients were enrolled, and  
15 73 patients were treated with either Smoflipid or a soybean oil lipid emulsion. Changes in  
16 mean triglyceride levels from baseline values to Week 4 were similar in both the Smoflipid  
17 and comparator groups. Mean albumin levels demonstrated a comparable decrease in both  
18 groups. Mean changes in body weight (kg) and BMI (kg/m<sup>2</sup>) were similar in both the  
19 Smoflipid and comparator group.

20 Study 2 was a phase 3, randomized, double-blind, active-controlled, multicenter study. A  
21 total of 249 postoperative adult patients were randomized to receive either Smoflipid or a  
22 soybean oil intravenous lipid emulsion for at least 5 days as part of their total parenteral  
23 nutrition (TPN) regimen. From baseline to Day 6, mean triglyceride levels increased  
24 similarly in both the Smoflipid and comparator groups.

25 Study 3 was a double-blind randomized, active-controlled, parallel-group, single-center  
26 study in 32 adult patients who required TPN for 10 to 14 days. Patients were treated with  
27 either Smoflipid or a soybean oil lipid emulsion. The increase in mean triglyceride levels  
28 from baseline to the final assessment was similar in both the Smoflipid and comparator  
29 groups.

1 **15 REFERENCES**

- 2 1. Mirtallo J, Canada T, Johnson D, Kumpf V, Petersen C, Sacks G, et al. Task Force for  
3 the Revision of Safe Practices for Parenteral Nutrition, Special Report: Safe practices for  
4 parenteral nutrition. *JPEN*. 2004;28 (6):S53-S55.

5 **16 HOW SUPPLIED/STORAGE AND HANDLING**

6 Smoflipid is a sterile lipid injectable emulsion with a lipid content of 0.2 gram/mL available  
7 in the following sizes:

- 8 • 100 mL: NDC 63323-820-00 10 bags/box  
9 • 250 mL: NDC 63323-820-74 10 bags/box  
10 • 500 mL: NDC 63323-820-50 12 bags/box

11 Smoflipid should be stored at 20° to 25°C (68° to 77°F). See USP Controlled Room  
12 Temperature. Avoid excessive heat. Do not freeze. If accidentally frozen, discard bag.  
13 Store in overpouch until ready for use.

14 After removing the overpouch, Smoflipid should be infused immediately. Chemical and  
15 physical in-use stability has been demonstrated for 24 hours at 25°C. If not used  
16 immediately, storage should not be longer than 24 hours at 2° to 8°C (36° to 46°F). After  
17 removal from storage, the product should be infused within 24 hours.

18 Admixtures containing Smoflipid should be infused immediately. If not used immediately,  
19 the product should not be stored longer than 24 hours at 2° to 8°C (36° to 46°F). After  
20 removal from storage, the emulsion should be infused within 24 hours.

21 **17 PATIENT COUNSELING INFORMATION**

22 Inform patients, their families, or caregivers of the following risks of Smoflipid:

- 23 • Deaths in Preterm Infants [*see Warnings and Precautions (5.1)*]  
24 • Hypersensitivity Reactions [*see Warnings and Precautions (5.2)*]  
25 • Risk of Catheter-Related Infections [*see Warnings and Precautions (5.3)*]  
26 • Fat Overload Syndrome [*see Warnings and Precautions (5.4)*]  
27 • Refeeding Syndrome [*see Warnings and Precautions (5.5)*]  
28 • Aluminum Toxicity [*see Warnings and Precautions (5.6)*]

- 1           • Risk of Parenteral Nutrition-Associated Liver Disease [*see Warnings and*  
2            *Precautions (5.7)*]  
3           • Hypertriglyceridemia [*see Warnings and Precautions (5.8)*]

4           Manufactured by:



6           Uppsala, Sweden

7           Fresenius Kabi, Oxalart, and Smoflipid are registered trademarks of Fresenius Kabi.

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