Pfizer Vaccine: Ingredients:

Dosage Forms, Strengths, Composition And Packaging

Hide

Pfizer-BioNTech COVID-19 Vaccine multiple dose vials are supplied in a carton containing 25 multiple dose vials or 195 multiple dose vials. Not all pack sizes may be available.

Table 1 – Dosage Forms, Strengths, Composition and Packaging

Route of Administration	Dosage Form / Strength/Composition	Non-medicinal Ingredients
Intramuscular injection	Suspension (to be diluted) Multiple dose vial (after dilution, each vial contains 5 doses of 0.3 mL)	• ALC-0315 = ((4-hydroxybutyl) azanediyl) bis(hexane-6,1-diyl) bis(2-hexyldecanoate) • ALC-0159 = 2-[(polyethylene glycol)-2000]-N,N-ditetradecylacetamide • 1,2-distearoyl-sn-glycero-3-phosphocholine • cholesterol • dibasic sodium phosphate dihydrate • monobasic potassium phosphate • potassium chloride • disodium hydrogen phosphate dihydrate • sodium chloride • sucrose • water for injection

Pfizer-BioNTech COVID-19 Vaccine is a white to off-white, sterile, preservative-free, frozen suspension for intramuscular injection. Pfizer-BioNTech COVID-19 Vaccine contains a nucleoside-modified messenger RNA (modRNA) encoding the viral spike glycoprotein (S) of SARS-CoV-2 and the non-medicinal ingredients listed in Table 1 above.

Pfizer-BioNTech COVID-19 Vaccine is packaged in a clear glass 2 mL vial with a rubber stopper (not made with natural rubber latex), aluminum overseal, and flip-off cap.

To help ensure the traceability of vaccines for patient immunization record-keeping as well as safety monitoring, health professionals should record the time and date of administration, quantity of administered dose (if applicable),

anatomical site and route of administration, brand name and generic name of the vaccine, the product lot number and expiry date.

ALC-0315:

https://en.wikipedia.org/wiki/ALC-0315

disodium hydrogen phosphate dihydrate:

4.1 Therapeutic Uses

Cathartics

National Library of Medicine's Medical Subject Headings online file (MeSH, 1999)

Sodium Phosphates Injection, USP, ... is indicated as a source of phosphorus, for addition to large volume intravenous fluids, to prevent or correct hypophosphatemia in patients with restricted or no oral intake. It is also useful as an additive for preparing specific parenteral fluid formulas when the needs of the patient cannot be met by standard electrolyte or nutrient solutions. /Included in US product label/

US Natl Inst Health; DailyMed. Current Medication Information for Sodium Phosphates (Sodium Phosphate) Injection (June 2006). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Visicol tablets are indicated for cleansing of the colon as a preparation for colonoscopy in adults 18 years of age or older. /Included in US product label/

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Although sodium and/or potassium phosphates have been used in the treatment of hypercalcemia, USP medical advisory panels do not recommend this use since these medications have been replaced by safer and more effective agents. /Phosphates/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2453

To determine whether phosphate supplementation, started soon after birth in adequate quantity, would prevent rickets in very low birth weight infants with prenatal deficiency of phosphate, 40 neonates were given an initial dose of 50 mg/day of phosphate administered as a mixture of 189 g of sodium phosphate dibasic (disodium hydrogen phosphate) and 82 g of sodium phosphate monobasic (sodium dihydrogen phosphate) made up to 2 liters with single strength chloroform water or placebo (single strength chloroform water). Supplementation was increased to 37.5 mg every 12 hr if the plasma phosphate concentration remained less than 1.5 mmol/L after one wk. Results showed that no infant receiving phosphate supplements had radiological evidence of rickets whereas bone changes were apparent in 42% of the control group. It was concluded that prenatal deficiency of phosphate, due to placental insufficiency, can be corrected by phosphate supplementation, thereby preventing rickets of prematurity.

Holland PC et al; Lancet 335: 697-701 (1990)

The objective of this study was to determine the safety and efficacy of 0.15 mmol/kg phosphorus (PHOS), administered intravenously as sodium or potassium phosphate over 120 minutes, in the treatment of adults suffering from severe hypophosphatemia. Severe hypophosphatemia was defined as a serum PHOS concentration of |LE/ 1.5 mg/dL. Exclusion criteria were renal impairment and hypercalcemia. Patient assessments included mental status, heart rate, and blood pressure. The timing of post-infusion serum PHOS sampling was at physician discretion. Six men and four women were enrolled in the study. During the study period, the only parenteral PHOS administered was the study dose. There were no patient adverse events associated with PHOS administration. One patient who received potassium phosphates had an elevated post-infusion serum potassium (5.2 mEq). Serum PHOS increased above the study criteria for severe hypophosphatemia in all ten patients, although nine patients received concomitant oral PHOS supplements. The dosing of intravenous sodium or potassium phosphate in the treatment of patients with severe hypophosphatemia is empiric. Historical evidence of toxicity has caused dosing recommendations to be low and slow. These data demonstrate the safety of a moderate PHOS dose when administered over two hours to adults, as measured by patient mental status, vital signs, and blood chemistry analysis.

Rice TL, Alaniz C; ASHP Midyear Clinical Meeting 26: PCR-13 (1991)

Sixty patients were randomly divided into three groups of 20 each. Each group was submitted to a bowel preparation with one of the following solutions: 10% manitol, sodium picosulfate or sodium phosphate. The parameters evaluated were: taste, tolerance, associated side effects and quality of cleansing. Postural blood pressure and pulse rate as well as serum sodium, potassium, calcium and phosphate were compared. ... Sodium phosphate and 10% manitol solutions provided superior results in terms of colon cleansing compared to sodium picosulfate solution...

Miki P Jr et al; Acta Cir Bras 23 (Supp 1): 108-11 (2008)

Oral phosphosoda is increasingly being used as a bowel preparation for colonoscopy, as it requires that a much smaller volume be ingested and is equally effective and less costly than polyethylene glycol-based electrolyte solutions. Oral phosphosoda has a good safety record, but complications of its use may occur.

Ullah N et al; J Clin Gastroenterol 34 (4): 457-8 (2002)

MEDICATION (VET): As pH buffer in parenterals and topical ophthalmics.

Rossoff, I.S. Handbook of Veterinary Drugs. New York: Springer Publishing Company, 1974., p. 545

MEDICATION (VET): For small animals: a disposable phosphate enema for effectively cleansing the lower bowel without irritating delicate membranes. Especially useful in cat hairball, atonic colon, post-vermifuge & prepn for abdominal surgery, spraying & diagnostic x-rays of intestinal tract. /Fleet veterinary enema/

Aronson, C.E. (ed.). Veterinary Pharmaceuticals & Biologicals, 1980-1981. Media, Pa.: Harwal Publishing Co., 1980., p. 16/244

MEDICATION (VET): Used in liquid feed supplements for cattle... When added as supplement (8-10 g daily) to phosphorus deficient rations, it produces dramatic increase in ram ejaculate volume and spermatozoa concentration within 45 days (approximate spermatogenesis time).

Rossoff, I.S. Handbook of Veterinary Drugs. New York: Springer Publishing Company, 1974., p. 545

MEDICATION (VET): Its simultaneous oral use with methenamine for urinary problems is seriously questioned as it liberates formaldehyde in intestinal tract rather than in urinary tract. Oral doses may be followed by methenamine in one hr to produce desired urinary effect.

Rossoff, I.S. Handbook of Veterinary Drugs. New York: Springer Publishing Company, 1974., p. 545

Urinary acidification by potassium and sodium phosphates combination and monobasic potassium phosphate augments the efficacy of methenamine mandelate and methenamine hippurate, which are dependent upon an acid medium for antibacterial activity. Phosphates eliminate the odor, rash, and turbidity present with ammoniacal urine associated with urinary tract infections. However, use of phosphates for urea splitting urinary tract infections may predispose to struvite stones that form in alkaline urine. /Included in US product labeling/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2453

Potassium and sodium phosphates combination and monobasic potassium phosphate have been used to reduce urinary calcium concentration and help prevent precipitation of calcium deposits in the urinary tract. /Included in US product labeling/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2453

4.2 Drug Warning

There have been rare, but serious reports of acute phosphate nephropathy in patients who received oral sodium phosphate products for colon cleansing prior to colonoscopy. Some cases have resulted in permanent impairment of renal function and some patients required long-term dialysis. While some cases have occurred in patients without identifiable risk factors, patients at increased risk of acute phosphate nephropathy may include those with increased age, hypovolemia, increased bowel transit time (such as bowel obstruction), active colitis, or baseline kidney disease, and those using medicines that affect renal perfusion or function (such as diuretics, angiotensin converting enzyme [ACE] inhibitors, angiotensin receptor blockers [ARBs], and possibly nonsteroidal anti-inflammatory drugs [NSAIDs]).

US Natl Inst Health; DailyMed. Current Medication Information for Osmoprep (sodium phosphate, monobasic, monohydrate, sodium phosphate, dibasic anhydrous) tablet (June 2009). Available from, as of April 5, 2010: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=10234

FDA has become aware of reports of acute phosphate nephropathy, a type of acute kidney injury, associated with the use of oral sodium phosphate products (OSP) for bowel cleansing prior to colonoscopy or other procedures. These products include the prescription products, Visicol and OsmoPrep, and OSPs available over-the-counter without a prescription as laxatives (e.g., Fleet Phospho-soda). In some cases when used for bowel cleansing, these serious adverse events have occurred in patients without identifiable factors that would put them at risk for developing acute kidney injury. We cannot rule out, however, that some of these patients were dehydrated prior

to ingestion of OSPs or they did not drink sufficient fluids after ingesting OSP. Acute phosphate nephropathy is a form of acute kidney injury that is associated with deposits of calcium-phosphate crystals in the renal tubules that may result in permanent renal function impairment. Acute phosphate nephropathy is a rare, serious adverse event that has been associated with the use of OSPs. The occurrence of these events was previously described in an Information for Healthcare Professionals sheet and an FDA Science Paper issued in May 2006. Additional cases of acute phosphate nephropathy have been reported to FDA and described in the literature since these were issued. Individuals who appear to have an increased risk of acute phosphate nephropathy following the use of OSPs include persons: who are over age 55; who are hypovolemic or have decreased intravascular volume; who have baseline kidney disease, bowel obstruction, or active colitis; and who are using medications that affect renal perfusion or function (such as diuretics, angiotensin converting enzyme [ACE] inhibitors, angiotensin receptor blockers [ARBs], and possibly nonsteroidal anti-inflammatory drugs [NSAIDs]). As a result of new safety information received, FDA is requiring the manufacturer of Visicol and OsmoPrep, the two OSPs available by prescription only, to add a Boxed Warning to the labeling for these products. FDA is also requiring that the manufacturer develop and implement a risk evaluation and mitigation strategy (REMS), which will include a Medication Guide, to ensure that the benefits of these products outweigh the risk of acute phosphate nephropathy, and to conduct a postmarketing clinical trial to further assess the risk of acute kidney injury with use of these products.

FDA/CDER; FDA Alert: Oral Sodium Phosphate (OSP) Products for Bowel Cleansing (marketed as Visicol and OsmoPrep, and oral sodium phosphate products available without a prescription) (12/11/2008). Available from: http://www.fda.gov/cder/drug/infopage/OSP_solution/default.htm as of March 20,2009.

This phosphate should not be confused with tribasic sodium phosphate which is very alkaline and has caustic action.

Osol, A. (ed.). Remington's Pharmaceutical Sciences. 16th ed. Easton, Pennsylvania: Mack Publishing Co., 1980., p. 745

Oral administration is safer, but careful monitoring of serum electrolyte levels and renal function is necessary. Nausea, vomiting, and diarrhea may occur and may be dose dependent. Concomitant use of antacids containing aluminum and/or magnesium should be avoided, because they may bind phosphate and prevent it absorption (calcium antacids also may bind phosphate, and it is assumed that these agents are not given to hypercalcemic patients). /Monobasic or dibasic sodium or potassium phosphate/

American Medical Association, Department of Drugs. Drug Evaluations. 6th ed. Chicago, Ill: American Medical Association, 1986., p. 897

Phosphate should not be given to patients with impaired renal function or hyperphosphatemia. They should not be given to patients with alkaline urine due to urinary tract infections because increased calcium and phosphate concentrations in the alkaline urine increase the risk of calcium phosphate stones. /Monobasic or dibasic sodium or potassium phosphate/

American Medical Association, Department of Drugs. Drug Evaluations. 6th ed. Chicago, Ill: American Medical Association, 1986., p. 897

Side/Adverse Effects: Those indicating need for medical attention: Incidence less frequent or rare: Fluid retention (swelling of feet or lower legs; weight gain); hyperkalemia (confusion; tiredness or weakness; irregular or slow heartbeat; numbness or tingling around lips, hands, or feet; unexplained anxiety; weakness or heaviness of legs; shortness of breath or troubled breathing); hypernatremia (confusion; tiredness or weakness; convulsion; decrease in amount of urine or in frequency of urinaton; fast heartbeat; headache or dizziness; increased thirst); hyperphosphatemia or hypocalcemia tetany (convulsions, muscle cramps, numbness, tingling, pain, or weakness in hands or feet; shortness of breath, tremor or troubled breathing); metastatic calcification. /Phosphates/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2454

Side/Adverse Effects: Those indicating need for medical attention only if they continue or are bothersome: Incidence less frequent - for oral dosage forms only: Laxative effect or diarrhea; nausea or vomiting; stomach pain. /Phosphates/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2454

/Sodium/ phosphate-containing enemas are known to alter the appearance of rectal mucosa.

Hardman, J.G., L.E. Limbird, P.B., A.G. Gilman. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 10th ed. New York, NY: McGraw-Hill, 2001., p. 1945

An elderly woman developed severe hyperphosphataemia, hypocalcaemia, and cardiac arrest after oral administration of sodium phosphate in preparation for colonoscopy. This is an unusual complication and is attributed to decreased phosphate excretion by the kidneys. At increased risk are patients with impaired renal function, age more than 65 years, and presenting with intestinal obstruction or decreased intestinal motility,

increased intestinal permeability, liver cirrhosis, or congestive heart failure...[Azzam I et al; Postgrad Med J 80 (946): 487-8 (2004)] Full text: PMC1743083

Hardman, J.G., L.E. Limbird, P.B., A.G. Gilman. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 10th ed. New York, NY: McGraw-Hill, 2001., p. 1945

Sodium phosphate induces serious electrolyte abnormalities in the elderly. The frequency and severity of hypokalemia is due to intestinal potassium loss associated with inadequate renal potassium conservation and is apparently more prevalent in frail patients. Assessment of serum electrolytes, phosphorus, and calcium prior to sodium phosphate preparation is advised, and in selected patients, postprocedural assessment and correction may be required.

Beloosesky Y et al; Arch Intern Med 163 (7): 803-8 (2003)

...Moderate renal failure in a 50-year-old man with a history of recent colonoscopy after oral sodium phosphate purgative use. ... The correct diagnosis /was initially missed/, but renal biopsy revealed signs of acute phosphate nephropathy. The patient had residual renal impairment at 8-month follow-up.

Demoulin N et al; Clin Nephrol 70 (2): 176-7 (2008)

A variety of adverse effects are associated with the use of hypertonic sodium phosphate enemas and laxatives in children. ... An unusual case of phosphate enema toxicity in a child that resulted in cardiopulmonary failure necessitating the use of extracorporeal membrane oxygenation /is described/.

Everman DB et al; Eur J Pediatr 162 (7-8): 517-9 (2003)

... A patient with mild Crohn disease (in remission), without history of renal disease, and with normal baseline renal function, ... developed acute renal failure (ARF) 14 days after bowel preparation for colonoscopy with oral sodium phosphate. A renal biopsy showed multifocal calcium phosphate deposition in the renal tubules against a background of diffuse chronic tubulointerstitial injury. Review of the literature suggested 2 distinct patterns of ARF in the context of sodium phosphate bowel cleansing. One pattern is characterized by ARF, which develops a few hours or days after sodium phosphate administration, as a component of a systemic syndrome associated with severe hyperphosphatemia and hypocalcemia. Correction of these electrolyte abnormalities was frequently associated with rapid recovery of renal function. The cause of ARF in this context was not clear because the

favorable outcome negated the need for renal biopsy. In the second pattern, exemplified by the current patient, ARF was identified incidentally. These patients did not have any features of an acute syndrome immediately after sodium phosphate administration and presented much later (usually weeks) with mild, nonspecific symptoms. At the time of presentation, the serum calcium and phosphate levels were normal. The renal biopsies in each of these patients showed nephrocalcinosis as the possible cause of ARF. The renal failure improved at least partially in most of these patients, but persisted in rare cases.

Gonlusen G et al; Arch Pathol Lab Med 130 (1): 101-6 (2006)

...A 75-years-old woman, stable on a three-weekly hemodialysis program over a period of 3 years, ... developed acute hyperphosphatemia secondary to phosphate administration for bowel preparation. The quick clinical diagnosis and the treatment with intensive hemodialysis resulted in a correction of hyperphosphatemia, hypocalcemia, acidemia and other electrolyte abnormalities. The phosphate cathartics are contraindicated in patients with severe renal insufficient or in dialysis program.

Gutierrez E et al; Nefrologia 24 (3): 283-7 (2004)

Oral phosphate preparations are used for constipation and bowel preparation in adults but with potential for fatal electrolyte disturbances. Use in children is not recommended due to similar concerns. ... A 7-week-old infant ... received an over-the-counter oral phosphate preparation. He developed profound hypocalcemia, hyperphosphatemia, life-threatening tetany, and respiratory failure requiring mechanical ventilation and intravenous calcium gluconate for recovery.

Hebbar K et al; Pediatr Emerg Care 22 (2): 118-20 (2006)

Oral sodium phosphate has been demonstrated in numerous clinical trials to be an effective and well-tolerated colonic cleansing agent. However, there exists a potential to induce shifts in intravascular volume. The phosphate load often results in hyperphosphatemia, which may precipitate hypocalcemia. A review at the authors' institution identified four patients with adverse events related to oral sodium phosphate. Three of these cases had pre-existing comorbidities that predisposed them to the adverse event, or had received doses higher than that used or recommended in previous trials.

Hookey LC, Vanner S; Can J Gastroenterol 18 (7): 455-8 (2004)

Fleet enema (sodium phosphate) is widely used for bowel preparation or constipation relief in the hospital and over the counter. The potential risks, including hyperphosphatemia and hypocalcemic coma should be kept in mind of primary care physician. The patients with older age, bowel obstruction, small intestinal disorders, poor gut motility, and renal disease are contraindicated or should be administered with caution. ... The case of a patient with old age and chronic renal failure who developed severe hyperphosphatemia and hypocalcemic tetany with coma after sodium phosphate enema /is presented/. ... The use of alternative enema preparations, such as simple tap water or saline solution enemas, which can prevent fatal complications in high risk patients /is recommended/.

Hsu HJ, Wu MS; Intern Med 47 (7): 643-6 (2008)

...A retrospective study /was conducted/ on patients with creatinine levels in the normal range who had undergone colonoscopy or flexible sigmoidoscopy using oral sodium phosphate solution (OSPS) preparation from January 1998 to February 2005 and followed them for 1 year to determine its effects on their renal function. A control group of patients with similar comorbidities during this period were chosen to assess age-related decline in renal function in this population. A total of 286 patients were selected in the study group, and 125 patients were selected in the control group. Both groups had similar baseline characteristics. The baseline glomerular filtration rate (GFR) in the study group was 79 mL/min/1.73 sq m, which declined to 73 mL/min/1.73 sq m at 6 months after exposure to OSPS preparation. This finding was significantly different from the control group, in whom the baseline GFR was 76 mL/min/1.73 m(2) and remained stable at 6 months. Linear regression analysis showed that use of angiotensin-converting enzyme inhibitors and/or angiotensin receptor blockers and the presence of diabetes were significant determinants of the fall in GFR after use of OSPS preparation. /It was concluded that/ Oral sodium phosphate solution preparation is associated with decline in GFR in elderly patients with creatinine levels in the normal range. Its routine use for elective and screening procedures should be discouraged in the elderly population.

Khurana A et al; Arch Intern Med 168 (6): 593-7 (2008); Comment in: Arch Intern Med 168 (6): 565-7 (2008); Arch Intern Med 168(20):2285 (2008); Arch Intern Med 168 (20): 2285-6 (2008); Arch Intern Med 168 (20): 2286 (2008); author reply 2286-7; Arch Intern Med 168 (19): 2166-7 (2008)

...An elderly patient with previously normal renal function ... developed severe hyperphosphatemia, hypocalcemia, and cardiac arrest after the administration of hypertonic sodium phosphate enemas for the treatment of an ileus. ... The patient characteristics that increase the risk of adverse effects from hypertonic sodium phosphate enemas /were reviewed/ and /the authors/ emphasize the danger that moderate dehydration poses when considering the use of these cathartics.

Kosseifi S et al; J Ky Med Assoc 106 (9): 431-4 (2008)

Lichtenstein GR et al; Aliment Pharmacol Ther 26 (5): 633-41 (2007) Dehydration-related complications may be avoided through proper patient screening, for example, renal function and comorbid conditions should be considered when choosing an appropriate bowel preparation. In addition, patient education regarding the importance of maintaining adequate hydration before, during and after bowel preparation may promote compliance with fluid volume recommendations and reduce the risk of dehydration-related adverse events.

Lichtenstein GR et al; Aliment Pharmacol Ther 26 (5): 633-41 (2007)

Acute phosphate nephropathy is an under recognized cause of acute and chronic renal failure. Potential etiologic factors include inadequate hydration (while receiving OSPS), increased patient age, a history of hypertension, and concurrent use of an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker.

Markowitz GS et al; J Am Soc Nephrol 16 (11): 3389-96 (2005)

A systematic search was conducted in Internet (MEDLINE), and the Cochrane Library, from January 1957 to March 2007. RESULTS: A total of 761 references were identified initially, and 39 relevant papers were finally selected. The most common therapeutic indications included constipation (63%). Sixty-eight per cent of the patients having adverse effects had associated conditions, the most common being gastrointestinal motility disorders, cardiological diseases and renal failure. Virtually, all side effects were due to water and electrolyte disturbances. Most patients were under 18 years of age (66%) or older than 65 years (25%). A total of 12 deaths were found. The main side effects caused by sodium phosphate enemas are water and electrolyte disturbances. The main risk factors are extreme age and associated comorbidity.

Mendoza J et al; Aliment Pharmacol Ther 26 (1): 9-20 (2007)

Acute phosphate nephropathy (APN) is a clinicopathological entity causing renal failure, after ingestion of oral sodium phosphate solution (OSPS). Approximately 25 cases have been described, but OSPS is still widely used. This study reports a further 5 cases and discusses the ever-growing significance of APN. Five cases of APN were included, 3 retrospectively whereas 2 were diagnosed prospectively. In all, use of OSPS was established, and other causes of nephrocalcinosis were excluded. Average age was 67.4 +/- 7.0 years, with a female preponderance (4:1). All patients had hypertension. Baseline serum creatinine: 0.7 to 1.2 mg/dL (creatinine clearance: 52 to 77 mL/min). Time from colonoscopy to presentation was 56 +/- 36 days. Serum creatinine levels at presentation: 1.4 to 3.6 mg/dL. Time from colonoscopy to renal biopsy was 123 +/- 88 days. Urinalysis showed minimal proteinuria, leucocyturia, and hematuria. One patient had renal glucosuria. All patients were anemic (hemoglobin 8.8-11.4 gr/dL). Serum calcium and phosphate were normal. One required hemodialysis. Mean follow-up was 36 +/- 17 months. Serum creatinine levels at end of follow-up were 1.3 to 3.1 mg/dL. Renal function did not recover

completely in any patient. Four required long-term erythropoietin treatment. The prominent histopathological findings were calcium-phosphate tubular depositions (100%), interstitial fibrosis (80%), hypertensive changes (80%), and acute tubular degenerative and regenerative changes (60%).

Ori Y et al; Am J Med Sci 336 (4): 309-14 (2008)

Within a 16-month period, 730 of patients referred for elective colonoscopy entered the study. Patients with known inflammatory bowel disease and those taking non-steroidal anti-inflammatory drugs were excluded. A sodium phosphate solution was ingested orally 14 and 8 hours before endoscopy. After standard colonoscopy, a 3-year clinical follow-up program was conducted. Endoscopically, mucosal lesions, possibly associated with sodium phosphate ingestion, were visible in 24 patients (3.3%). Erosions were found in 3 patients, aphthoid lesions in 21 patients, and an ulcer in one patient. Lesions often were multiple. Histopathologically, findings included focal active inflammation in 14 of 24 patients, mucosal disruption and erosion (7/24), edema of the lamina propria (5/24), mucosal hyperemia or focal hemorrhage (5/24), lymphoid nodules (5/24), and ulceration (1/24). Orally administered sodium phosphate-associated colonic mucosal abnormalities are infrequent but can mimic an non-steroidal anti-inflammatory drug-induced injury or inflammatory bowel disease, and in particular must be differentiated from Crohn's disease.

Rejchrt S et al; Gastrointest Endosc 59 (6): 651-4 (2004)

The aim of this study was to estimate the risk of further creatinine increase in patients with preexisting renal disease after the use of oral sodium phosphate (OSP) versus polyethylene glycol (PEG), and to study usage patterns of OSP in relation to renal function. A cohort study was done using clinical records and electronic patient information from the Henry Ford Health System (HFHS) in patients who had used either OSP or PEG for colonoscopy between February 1999 and April 2006. ... The study population included 317 patients with a baseline GFR < 60 mL/min, /with one case of/ an unexplained creatinine increase > or = 0.5 mg/dL among 191 PEG users (0.5%) versus eight cases among 126 OSP users (6.3%). Unadjusted and adjusted relative risk estimates on comparing OSP with PEG were 12.1 (95% CI, 1.5-95.8) and 12.6 (95% CI, 1.5-106.5), respectively. ... In patients with preexisting renal disease, OSP use was associated with an increased risk of aggravated renal dysfunction versus PEG. Creatinine measurement with GFR estimation should be done before OSP administration in order to avoid its use in patients with renal disease.

Russmann S et al; Am J Gastroenterol 103 (11): 2707-16 (2008)

A chart review performed on 311 patients who had colonoscopy ... prepared with either oral sodium phosphate solution (OSPS) (n = 157) or polyethylene glycol (PEG) (n = 154). Patients had a baseline serum creatinine <

or=1.5 mg/dL. Effect of bowel preparation on the renal function was evaluated by measuring the absolute change in levels of serum creatinine and the proportion of patients who developed a 50% or more increase above their baseline serum creatinine value. Oral sodium phosphate solution resulted in a slight increase in serum creatinine from 1.0 +/- 0.02 to 1.1 +/- 0.02 mg/dL (P = 0.07) and PEG resulted in a small decrease in serum creatinine from 1.1 +/- 0.02 to 1.0 +/- 0.03 mg/dL (P = 0.03). The absolute change in serum creatinine was slightly higher with OSPS than with PEG (0.04 +/- 0.02 vs. -0.05 +/- 0.02 mg/dL; P = 0.005)...

Singal AK et al; Aliment Pharmacol Ther 27 (1): 41-7 (2008); Comment in: Nat Clin Pract Gastroenterol Hepatol 5 (9): 482-3 (2008)

Case report of a 62-year-old woman who developed acute renal failure due to nephrocalcinosis, also called acute phosphate nephropathy, after large bowel cleansing in preparation for colonoscopy using oral sodium phosphate solution (Phosphoral). Subsequently her renal insufficiency resolved only partially resulting in stage 4 chronic kidney disease. In retrospect multiple risk factors for this condition (hypertension, diuretics, AT-II receptor blocker, female gender, advanced age and volume depleting due to vomiting and nausea) were identified...

Slee TM et al; Neth J Med 66 (10): 438-41 (2008)

In an unselected group of 100 consecutive patients attending for out patient colonoscopy, 45% of patients had raised serum phosphate, which was positively correlated with creatinine and age. There was a negative association of phosphate with calcium; 16% of patients had hypocalcemia and 26% had hypokalemia. Patients taking ACE inhibitors, AT2 antagonists, or diuretics were associated with hyperphosphatemia. Significant electrolyte and metabolic disturbance from colonoscopy preparation has been shown with NaP preparation, without overt clinical effects. /It was recommended/ that elderly patients and those with significant comorbidity have their electrolytes and calcium measured, and diuretics and ACE inhibitors stopped, before NaP administration. Endoscopy units should be alert for patients who might be suffering from electrolyte disturbance postpreparation and be prepared to measure their electrolytes.

Ainley EJ et al; Dig Dis Sci 50 (7): 1319-23 (2005)

Oral sodium phosphate has become an attractive alternative to polyethylene glycol for colonic cleansing preparatory to elective colorectal surgery. Its use, however, has been associated with hypokalaemia. The authors of the present study tested the hypothesis that patients with cellular depletion of potassium are at significant risk for hypokalemia with oral sodium phosphate bowel preparation.

Hill Ag et al; Aust N Z J Surg 68 (12): 856-8 (1998)

Evidence is emerging that sodium phosphate (NaP), a commonly used oral cathartic agent, causes aphthoid ulcers or focal active colitis (FAC) in the colon and rectum.

Driman DK, Preiksaitis HG; Hum Pathol 29 (9): 972-8 (1998)

A patient who died as a result of severe hypocalcaemia and hyperphosphatemia after treatment with a sodium-phosphate enema. Physicians should be aware of the risk when using these enemas, even in normal doses, especially in elderly patients without signs of renal failure, as in our patient.

Farah R; Acta Gastroenterol Belg 68 (3): 392-3 (2005)

The findings of diffuse tubular injury with abundant tubular calcium phosphate deposits on renal biopsy are referred to as nephrocalcinosis, a condition typically associated with hypercalcemia. During the period from 2000 to 2004, 31 cases of nephrocalcinosis were identified among the 7349 native renal biopsies processed at Columbia University. Among the 31 patients, 21 presented with acute renal failure (ARF), were normocalcemic, and had a history of recent colonoscopy preceded by bowel cleansing with oral sodium phosphate solution (OSPS) or Visicol. Because the precipitant was OSPS rather than hypercalcemia, these cases are best termed acute phosphate nephropathy. The cohort of 21 patients with APhN was predominantly female (81.0%) and white (81.0%), with a mean age of 64.0 yr. Sixteen of the 21 patients had a history of hypertension, 14 (87.5%) of whom were receiving an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker. The mean baseline serum creatinine was 1.0 mg/dl, available within 4 mo of colonoscopy in 19 (90.5%) patients. Patients presented with ARF and a mean creatinine of 3.9 mg/dl at a median of 1 mo after colonoscopy. In a few patients, ARF was discovered within 3 d of colonoscopy, at which time hyperphosphatemia was documented. Patients had minimal proteinuria, normocalcemia, and bland urinary sediment. At follow-up (mean 16.7 mo), four patients had gone on to require permanent hemodialysis. The remaining 17 patients all have developed chronic renal insufficiency (mean serum creatinine, 2.4 mg/dl). Acute phosphate nephropathy is an underrecognized cause of acute and chronic renal failure. Potential etiologic factors include inadequate hydration (while receiving OSPS), increased patient age, a history of hypertension, and concurrent use of an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker.

Markowitz GS et al; J Am Soc Nephrol 16 (11): 3389-96 (2005)

A patient who died as a result of severe hyperphosphatemia after an oral phosphosoda bowel preparation /is described/. A 55-year-old man was admitted with rectal bleeding, abdominal pain, and vomiting. He had a history

of diabetes, hypertension, and end-stage renal disease and had successful renal transplant 3 years prior. His initial serum creatinine, calcium, phosphate, and electrolyte levels were normal. He vomited after polyethylene glycol-based electrolyte solution, and an alternate bowel preparation with oral phosphosoda was recommended. He received 90 mL of oral phosphosoda as a single dose. Six hours later, he had cardiorespiratory arrest and was found to have hyperphosphatemia (serum phosphate, 17.8 mg/dL), a high anion gap acidosis, hypoxia, and oliguric renal failure. Resuscitation was unsuccessful. Autopsy showed ischemic colitis. /It was concludeed/ that bowel preparation with phosphosoda may be associated with severe complications and should be avoided if there is any suggestion of impaired renal function or poor gut motility.

Ullah N et al; J Clin Gastroenterol 34 (4): 457-8 (2002)

This case report describes a patient who was previously prescribed alendronate (Fosamax) and presented with postoperative hypophosphatemia and hypocalcemic tetany after bowel preparation with Fleet Phospho-Soda. This report suggests that patients taking bone metabolism regulators may not be able to respond appropriately to hypocalcemic stressors.

Campisi P et al; Dis Colon Rectum 42 (11): 1499-501 (1999)

To avoid phosphorus intoxication, infuse solutions containing sodium phosphate slowly. Infusing high concentrations of phosphorus may result in a reduction of serum calcium and symptoms of hypocalcemic tetany. Calcium levels should be monitored.

US Natl Inst Health; DailyMed. Current Medication Information for Sodium Phosphates (Sodium Phosphate) Injection (June 2006). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

/Sodium Phosphates for injection/ contains aluminum that may be toxic. Aluminum may reach toxic levels with prolonged parenteral administration if kidney function is impaired. Premature neonates are particularly at risk because their kidneys are immature, and they require large amounts of calcium and phosphate solutions, which contain aluminum.

US Natl Inst Health; DailyMed. Current Medication Information for Sodium Phosphates (Sodium Phosphate) Injection (June 2006). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Research indicates that patients with impaired kidney function, including premature neonates, who receive parenteral levels of aluminum at greater than 4 to 5 ug/kg/day accumulate aluminum at levels associated with central nervous system and bone toxicity. Tissue loading may occur at even lower rates of administration.

US Natl Inst Health; DailyMed. Current Medication Information for Sodium Phosphates (Sodium Phosphate) Injection (June 2006). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Phosphorus replacement therapy with sodium phosphate should be guided primarily by the serum phosphorus level and the limits imposed by the accompanying sodium (Na+) ion.

US Natl Inst Health; DailyMed. Current Medication Information for Sodium Phosphates (Sodium Phosphate) Injection (June 2006). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Use with caution in patients with renal impairment, cirrhosis, cardiac failure and other edematous or sodium-retaining states.

US Natl Inst Health; DailyMed. Current Medication Information for Sodium Phosphates (Sodium Phosphate) Injection (June 2006). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Caution must be exercised in the administration of parenteral fluids, especially those containing sodium ions, to patients receiving corticosteroids or corticotropin.

US Natl Inst Health; DailyMed. Current Medication Information for Sodium Phosphates (Sodium Phosphate) Injection (June 2006). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

There have been reports of acute phosphate nephropathy, acute renal failure, seizures, and cardiac arrhythmias with post-marketing use of Visicol tablets.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

There have been spontaneous reports of adverse events with post-marketing use of Visicol tablets. These include rare reports of hypersensitivity reactions (eg, rash, urticaria, pruritus, tongue edema, throat tightness, and paresthesia of the lips).

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

FDA Pregnancy Risk Category: C /RISK CANNOT BE RULED OUT. Adequate, well controlled human studies are lacking, and animal studies have shown risk to the fetus or are lacking as well. There is a chance of fetal harm if the drug is given during pregnancy; but the potential benefits may outweigh the potential risk./

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Because published data suggest that sodium phosphate absorption may be enhanced in patients experiencing an acute exacerbation of inflammatory bowel disease (IBD), Visicol tablets should be used with caution in IBD patients.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Administration of Visicol tablets may induce colonic mucosal aphthous ulcerations, since this endoscopic finding observed with other sodium phosphate cathartic preparations. This colonoscopic finding should be considered in patients with known or suspect inflammatory bowel disease (IBD).

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Patients with a history of swallowing difficulties or anatomic narrowing of the esophagus, such as a stricture, may have difficulty swallowing Visicol tablets. Undigested or partially digested Visicol tablets may be seen in the stool or during colonoscopy. In addition, undigested tablets from other medications may be seen in the stool or during colonoscopy.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Prolongation of the QT interval has been observed in some patients who were dosed with Visicol tablets. QT prolongation with Visicol tablets has been associated with electrolyte imbalances, such as hypokalemia and hypocalcemia. Visicol tablets should be used with caution in patients who are taking medications known to prolong the QT interval, since serious complications may occur. Pre-dose and post-colonoscopy ECGs should be considered in patients with known prolonged QT.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Inadequate fluid intake, as with any effective purgative, may lead to excessive fluid loss and hypovolemia. Dehydration from purgation may be exacerbated by inadequate oral fluid intake, vomiting, and/or the use of diuretics. Patients should not take additional laxatives or purgatives, particularly additional sodium phosphate-based products.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

There have been rare, but serious reports of arrhythmias associated with the use of sodium phosphate products. Visicol should be used with caution in patients with higher risk of arrhythmias (patients with a history of cardiomyopathy, patients with prolonged QT, patients with a history of uncontrolled arrhythmias, and patients with a recent history of a myocardial infarction). Pre-dose and post-colonoscopy ECGs should be considered in patients with high risk of serious, cardiac arrhythmias.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

There have been rare reports of generalized tonic-clonic seizures and/or loss of consciousness associated with use of sodium phosphate products in patients with no prior history of seizures. The seizure cases were associated with electrolyte abnormalities (e.g., hyponatremia, hypokalemia, hypocalcemia, and hypomagnesemia) and low serum osmolality. The neurologic abnormalities resolved with correction of fluid and electrolyte abnormalities. Visicol should be used with caution in patients with a history of seizures and in patients at higher risk of seizure [patients using concomitant medications that lower the seizure threshold (such as tricyclic antidepressants), patients withdrawing from alcohol or benzodiazepines, or patients with known or suspected hyponatremia)].

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Use Visicol with caution in patients with impaired renal function, known or suspected electrolyte disturbances, or people taking concomitant medications that may affect electrolyte levels (such as diuretics). Patients with electrolyte abnormalities such as hypernatremia, hyperphosphatemia, hypokalemia, or hypocalcemia should have them corrected before treatment with Visicol tablets.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

There have been rare, but serious reports of renal failure and acute phosphate nephropathy (also known as nephrocalcinosis) in patients who received oral sodium phosphate products (including oral sodium phosphate solutions and tablets) for colon cleansing prior to colonoscopy. These cases often resulted in permanent impairment of renal function and several patients required long-term dialysis. Patients at increased risk of acute phosphate nephropathy may include patients with the following: hypovolemia, baseline kidney disease, increased age, and patients using medicines that affect renal perfusion or function [such as diuretics, angiotensin converting enzyme (ACE) inhibitors, angiotensin receptor blockers, and possibly nonsteroidal anti-inflammatory drugs (NSAIDs)].

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Considerable caution should be advised before Visicol tablets are used in patients with the following illnesses: severe renal insufficiency (creatinine clearance less than 30 mL/minute), congestive heart failure, ascites, unstable angina, acute bowel obstruction, bowel perforation, toxic megacolon, gastric retention, ileus, pseudo-obstruction of the bowel, severe chronic constipation, acute colitis, gastric bypass or stapling surgery or hypomotility syndrome.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Administration of sodium phosphate products prior to colonoscopy has resulted in fatalities due to significant fluid shifts, severe electrolyte abnormalities, and cardiac arrhythmias. These fatalities have been observed in patients with renal insufficiency, in patients with bowel perforation, and in patients who misused or overdosed sodium phosphate products.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Visicol tablets are contraindicated in patients with biopsy-proven acute phosphate nephropathy.

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

Use of potassium phosphates injection in digitalized patients with severe or complete heart block is not recommended because of possible hyperkalemia. /Phosphates/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2453

Concurrent use /of angiotension-converting enzyme (ACE) inhibitors; nonsteroidal anti-inflammatory drugs (NSAIDs); cyclosporine; potassium-sparing diuretics; chronic use of heparin; low-salt milk; other potassium-containing medications; or salt substitutes/ with potassium phosphate may result in hyperkalemia, especially in patients with renal impairment; patient should have serum potassium concentration determinations at periodic intervals. /Phosphates/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2453

4.3 Minimum/Potential Fatal Human Dose

The estimated fatal dose of sodium phosphates is 50 g.

Dreisbach, R.H. Handbook of Poisoning. 12th ed. Norwalk, CT: Appleton and Lange, 1987., p. 212

5 Pharmacology and Biochemistry

5.1 Absorption, Distribution and Excretion

... Phosphates (dibasic and monobasic sodium phosphate) are slowly and incompletely absorbed. /Dibasic and Monobasic Sodium phosphate/

Gosselin, R.E., H.C. Hodge, R.P. Smith, and M.N. Gleason. Clinical Toxicology of Commercial Products. 4th ed. Baltimore: Williams and Wilkins, 1976., p. II-83

Net phosphorus absorption may occur in the small intestine in some species but is primarily a function of the colon in horses. /Phosphorus/

Booth, N.H., L.E. McDonald (eds.). Veterinary Pharmacology and Therapeutics. 5th ed. Ames, Iowa: Iowa State University Press, 1982., p. 640

Elimination: Renal (90%) and fecal (10%). /Phosphates/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2453

Ingested phosphates are absorbed from the gastrointestinal tract. However, the presence of large amounts of calcium or aluminum may lead to formation of insoluble phosphate and reduce the net absorption. Vitamin D stimulates phosphate absorption. /Phosphates/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2453

Transport of phosphate from the gut lumen is an active, energy-dependent process ... In adults, about two-thirds of the ingested phosphate is absorbed and is almost entirely excreted into the urine. In growing children, phosphate balance is positive. Concentrations of phosphate in plasma are higher in children than in adults. This "hyperphosphatemia" decreases the affinity of hemoglobin for oxygen and is hypothesized to explain the physiological "anemia" of childhood. /Phosphates/

Hardman, J.G., L.E. Limbird, P.B., A.G. Gilman. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 10th ed. New York, NY: McGraw-Hill, 2001., p. 1721

More than 90% of plasma phosphate is filterable, of which 80% is actively reabsorbed. Most reabsorption occurs in the initial segment of the proximal tubule, with a lesser component in the pars recta ... Phosphate excreted in the urine represents the difference between the amt filtered and that reabsorbed. Expansion of plasma volume increases urinary phosphate excretion. Parathyroid hormone (PTH) increases urinary phosphate excretion by blocking reabsorption. Vitamin D and its metabolites directly stimulate proximal tubular phosphate reabsorption. /Phosphates/

Hardman, J.G., L.E. Limbird, P.B., A.G. Gilman. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 10th ed. New York, NY: McGraw-Hill, 2001., p. 1721

Artery blood pressure is a major determinant of Na+ excretion ... The renin-angiotensin system plays a major role in maintaining a constant set point for long-term levels of arterial blood pressure despite extreme changes in dietary Na+ intake ... When dietary Na+ intake is low, renin release is stimulated, and angiotensin II acts on the kidney to shift the renal pressure-natriuresis curve to the right ... When dietary Na+ is high, renin release is inhibited, and the withdrawal of angiotensin II causes the renal pressure-natriuresis curve to shift to the left. Consequently, the intersection of salt intake with the renal pressure-natriuresis curve remains near the same set point ... /Na+ excretion/

Hardman, J.G., L.E. Limbird, P.B., A.G. Gilman. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 10th ed. New York, NY: McGraw-Hill, 2001., p. 820

Intravenously infused phosphorus not taken up by the tissues is excreted almost entirely in the urine. Plasma phosphorus is believed to be filterable by the renal glomeruli, and the major portion of filtered phosphorus (greater than 80%) is actively reabsorbed by the tubules. Many modifying influences tend to alter the amount excreted in the urine.

US Natl Inst Health; DailyMed. Current Medication Information for Sodium Phosphates (Sodium Phosphate) Injection (June 2006). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

An open-label pharmacokinetic study of Visicol in healthy volunteers was performed to determine the concentration-time profile of serum inorganic phosphorus levels after Visicol administration. All subjects received a total of 60 grams of sodium phosphate with a total liquid volume of 3.6 quarts. Subjects received a 30 gram dose (20 tablets given as 3 tablets every 15 minutes with 8 ounces of clear liquids) beginning at 6 PM and then received a second 30 gram dose (20 tablets given as 3 tablets every 15 minutes with 8 ounces of clear liquids) the following morning beginning at 6 AM. Twenty-three healthy subjects (mean age 57 years old; 57% male and 43% female; and 65% Hispanic, 30% Caucasian, and 4% African-American) participated in this pharmacokinetic study. The serum phosphorus level rose from a mean (+/- standard deviation) baseline of 4.0 (+/- 0.7) mg/dL to 7.7 (+/- 1.6 mg/dL), at a median of 3 hours after the administration of the first 30 gram dose of Visicol tablets The serum phosphorus level rose to a mean of 8.4 (+/- 1.9) mg/dL, at a median of 4 hours after the administration of the second 30 gram dose of Visicol tablets. The serum phosphorus level remained above baseline for a median of 24 hours after the administration of the initial dose of Visicol tablets (range 16 to 48 hours).

US Natl Inst Health; DailyMed. Current Medication Information for VISICOL (sodium phosphate, monobasic, monohydrate and sodium phosphate, dibasic anhydrous) tablet (November 2008). Available from, as of March 20, 2009: http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=1758

5.2 Mechanism of Action

At the renal distal tubule, the secretion of hydrogen by the tubular cell in exchange for sodium in the tubular urine converts dibasic phosphate salts to monobasic phosphate salts. Therefore, large amounts of acid can be excreted without lowering the pH of the urine to a degree that would block hydrogen transport by a high concentration gradient between the tubular cell and luminal fluid. /Phosphates/

Thomson/Micromedex. Drug Information for the Health Care Professional. Volume 1, Greenwood Village, CO. 2006., p. 2453

1,2-distearoyl-sn-glycero-3-phosphocholine:

Avanti Polar Lipids, Inc. 700 Industrial Park Drive, Alabaster, AL 35007,USA • (800) 227-0651 • (205) 663-2494 • Fax(800) 229-1004•(205) 663-0756 • E-mail Orders: orders@avantilipids.com • E-mail Inquiries: info@avantilipids.com • E-mail Technical Questions: technical@avantilipids.com • Visit www.avantilipids.com 1. PRODUCT AND COMPANY IDENTIFICATION 1.1 Product identifiers Product name : 1,2-distearoyl-sn-glycero-3-phosphocholine Product Number : 850365C Brand : AVANTI 1.2 Relevant identified uses of the substance or mixture and uses advised against Identified uses : Laboratory chemicals, Synthesis of substances 1.3 Details of the supplier of the safety data sheet Company : Avanti Polar Lipids, INC 700 Industrial Park Drive Alabaster, Al 35007 United States of America Telephone : (205) 663-2494 Fax : (205) 663-0756 1.4 Emergency telephone number Emergency Phone # : +1 703-741-5970 / 1800-424-9300(CHEMTREC) 2. HAZARDS IDENTIFICATION 2.1 Classification of the substance or mixture GHS Classification in accordance with 29 CFR 1910 (OSHA HCS) Acute toxicity, Oral (Category 4), H302 Acute toxicity, Inhalation (Category 3), H331 Skin irritation (Category 2), H315 Eye irritation (Category 2A), H319 Carcinogenicity (Category 2), H351 Reproductive toxicity (Category 2), H361d Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336 Specific target organ toxicity - repeated exposure (Category 1), Liver, Kidney, H372 Acute aquatic toxicity (Category 3), H402 For the full text of the H-Statements mentioned in this Section, see Section 16. 2.2 GHS Label elements, including precautionary statements Pictogram Signal word Danger Hazard statement(s) H302 Harmful if swallowed. H315 Causes skin irritation. H319 Causes serious eye irritation. H331 Toxic if inhaled. H336 May cause drowsiness or dizziness. AVANTI - 850365C Page 2 of 8 H351 Suspected of causing cancer. H361d Suspected of damaging the unborn child. H372 Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure. H402 Harmful to aquatic life. Precautionary statement(s) P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. P264 Wash skin thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P271 Use only outdoors or in a well-ventilated area. P273 Avoid release to the environment. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection. P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth. P302 + P352 IF ON SKIN: Wash with plenty of soap and water. P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor. P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P308 + P313 IF exposed or concerned: Get medical advice/ attention. P332 + P313 If skin irritation occurs: Get medical advice/ attention. P337 + P313 If eye irritation persists: Get medical advice/ attention. P362 Take off contaminated clothing and wash before reuse. P403 + P233 Store in a well-ventilated place. Keep container tightly closed. P405 Store locked up. P501 Dispose of contents/ container to an approved waste disposal plant. 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none 3. COMPOSITION/INFORMATION ON INGREDIENTS 3.2 Mixtures Synonyms : 18:0 PC (DSPC) Molecular weight : 119.38 g/mol Hazardous components Component Classification Concentration Chloroform CAS-No. EC-No. Index-No. 67-66-3 200-663-8 602-006-00-4 Acute Tox. 4;

Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; Repr. 2; STOT SE 3; STOT RE 1; Aquatic Acute 3; H302, H315, H319, H331, H336, H351, H361d, H372, H402 90 - 100 % For the full text of the H-Statements mentioned in this Section, see Section 16. 4. FIRST AID MEASURES 4.1 Description of first aid measures General advice Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area. AVANTI - 850365C Page 3 of 8 If inhaled If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician. In case of skin contact Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician. In case of eye contact Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. If swallowed Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician. 4.2 Most important symptoms and effects, both acute and delayed The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11 4.3 Indication of any immediate medical attention and special treatment needed No data available 5. FIREFIGHTING MEASURES 5.1 Extinguishing media Suitable extinguishing media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. 5.2 Special hazards arising from the substance or mixture No data available 5.3 Advice for firefighters Wear self-contained breathing apparatus for firefighting if necessary. 5.4 Further information No data available 6. ACCIDENTAL RELEASE MEASURES 6.1 Personal precautions, protective equipment and emergency procedures Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection see section 8. 6.2 Environmental precautions Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided. 6.3 Methods and materials for containment and cleaning up Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal. 6.4 Reference to other sections For disposal see section 13. 7. HANDLING AND STORAGE 7.1 Precautions for safe handling Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. For precautions see section 2.2. 7.2 Conditions for safe storage, including any incompatibilities Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Recommended storage temperature -25 - -15 °C Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects 7.3 Specific end use(s) Apart from the uses mentioned in section 1.2 no other specific uses are stipulated AVANTI - 850365C Page 4 of 8 8. EXPOSURE CONTROLS/PERSONAL PROTECTION 8.1 Control parameters Components with workplace control parameters Component CAS-No. Value Control parameters Basis Chloroform 67-66-3 TWA 10 ppm USA. ACGIH Threshold Limit Values (TLV) Remarks Central Nervous System impairment Liver damage Embryo/fetal damage Confirmed animal carcinogen with unknown relevance to humans ST 2 ppm 9.78 mg/m3 USA. NIOSH Recommended Exposure Limits Potential Occupational Carcinogen See Appendix A C 50 ppm 240 mg/m3 USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants The value in mg/m3 is approximate. Ceiling limit is to be determined from breathing-zone air samples. PEL 2 ppm 9.78 mg/m3 California permissible exposure limits for chemical contaminants (Title 8, Article 107) 8.2 Exposure controls Appropriate engineering controls Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Personal protective equipment Eye/face protection Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Skin protection Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good

laboratory practices. Wash and dry hands. Body Protection Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Respiratory protection Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Control of environmental exposure Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided. 9. PHYSICAL AND CHEMICAL PROPERTIES 9.1 Information on basic physical and chemical properties a) Appearance Form: liquid Colour: colourless b) Odour sweet c) Odour Threshold No data available AVANTI - 850365C Page 5 of 8 d) pH No data available e) Melting point/freezing point Melting point: -63.5 °C (-82.3 °F) at 1,013 hPa (760 mmHg) f) Initial boiling point and boiling range 61.2 °C (142.2 °F) at 1,013 hPa (760 mmHg) g) Flash point - DIN 51755 Part 1does not flash h) Evaporation rate No data available i) Flammability (solid, gas) No data available j) Upper/lower flammability or explosive limits No data available k) Vapour pressure 210 hPa (158 mmHg) at 20 °C (68 °F) l) Vapour density 4.12 - (Air = 1.0) m) Relative density 1.49 g/cm3 n) Water solubility 8.7 g/l at 23 °C (73 °F) - OECD Test Guideline 105 o) Partition coefficient: noctanol/water log Pow: 1.97 at 25 °C (77 °F) - (ECHA), Bioaccumulation is not expected. p) Auto-ignition temperature > 600 °C (> 1,112 °F) at 1,013 hPa (760 mmHg) - DIN 51794 q) Decomposition temperature Distillable in an undecomposed state at normal pressure. r) Viscosity No data available s) Explosive properties No data available t) Oxidizing properties No data available 9.2 Other safety information Solubility in other solvents organic solvent at 20 °C (68 °F) - miscible Surface tension 27.1 mN/m at 20.0 °C (68.0 °F) Relative vapour density 4.12 - (Air = 1.0) 10. STABILITY AND REACTIVITY 10.1 Reactivity No data available 10.2 Chemical stability Stable under recommended storage conditions. Contains the following stabiliser(s): Ethanol (0.5 %) 10.3 Possibility of hazardous reactions No data available 10.4 Conditions to avoid No data available 10.5 Incompatible materials Strong oxidizing agents, Strong bases, Magnesium, Sodium/sodium oxides, Lithium, various plastics 10.6 Hazardous decomposition products Other decomposition products - No data available Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx), Oxides of phosphorus, Hydrogen chloride gas In the event of fire: see section 5 AVANTI - 850365C Page 6 of 8 11. TOXICOLOGICAL INFORMATION 11.1 Information on toxicological effects Acute toxicity Dermal: No data available No data available Skin corrosion/irritation No data available Serious eye damage/eye irritation No data available Respiratory or skin sensitisation No data available Germ cell mutagenicity No data available Carcinogenicity IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chloroform) NTP: RAHC - Reasonably anticipated to be a human carcinogen (Chloroform) OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens. Reproductive toxicity No data available No data available Specific target organ toxicity - single exposure No data available Specific target organ toxicity - repeated exposure No data available Aspiration hazard No data available Additional Information RTECS: Not available To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Stomach - Irregularities - Based on Human Evidence Stomach - Irregularities - Based on Human Evidence (Chloroform) Stomach - Irregularities - Based on Human Evidence (Ethanol) 12. ECOLOGICAL INFORMATION 12.1 Toxicity No data available 12.2 Persistence and degradability No data available 12.3 Bioaccumulative potential No data available 12.4 Mobility in soil No

data available 12.5 Results of PBT and vPvB assessment PBT/vPvB assessment not available as chemical safety assessment not required/not conducted 12.6 Other adverse effects

Polyethylene glycol 3350 Side Effects:

- Overview
- Side Effects
- Dosage
- Professional
- Interactions
- More
- Professional

- Managing Side Effects

For the Consumer

*Applies to **polyethylene glycol 3350**: oral kit, oral powder for reconstitution*

Warning

You should not use this medicine if you have a **bowel obstruction** or intestinal blockage. If you have any of these conditions, you could have dangerous or life-threatening side effects from polyethylene glycol 3350.

Do not use polyethylene glycol 3350 more than once per day. Call your doctor if you are still constipated or irregular after using this medication for 7 days in a row.

Get emergency medical help if you have signs of an allergic reaction: **hives**; difficult breathing; swelling of your face, lips, tongue, or throat.

Stop taking this medicine and call your doctor at once if you have:

- severe or bloody **diarrhea**;
- **rectal bleeding**;
- blood in your stools; or
- severe and worsening stomach pain.

Common side effects may include:

- **bloating**, gas, **upset stomach**;
- **dizziness**; or
- increased sweating.

This is not a complete list of side effects and others may occur. Call your doctor for medical advice about side effects.

For Healthcare Professionals

Applies to polyethylene glycol 3350: oral kit, oral powder for reconstitution

Gastrointestinal

Frequency not reported: **Abdominal distension** and pain, borborygmi, **nausea**, **vomiting**, diarrhea, bloating, **flatulence**, abdominal cramping, perianal inflammation and soreness[Ref]

Hypersensitivity

Frequency not reported: Allergic reaction[Ref]

References

1. Cerner Multum, Inc. "Australian Product Information." O 0

Further information

Always consult your healthcare provider to ensure the information displayed on this page applies to your personal circumstances.

Some side effects may not be reported. You may report them to the **FDA**.

Medical Disclaimer

Sodium biphosphate / sodium phosphate Side Effects:

Medically reviewed by Drugs.com. Last updated on Mar 30, 2020.

- Overview
- Side Effects
- Dosage
- Professional
- Interactions
- More
- Professional

- Managing Side Effects

For the Consumer

*Applies to **sodium biphosphate / sodium phosphate**: oral solution, oral tablet*

Other dosage forms:

- **rectal enema**

Warning

Oral route (Tablet)

Acute phosphate nephropathy has been reported in association with the use of oral **sodium phosphate** products, some cases resulting in permanent impairment of renal function, including cases requiring long-term dialysis. Risk factors for developing acute phosphate nephropathy include increased age, hypovolemia, renal impairment, **bowel obstruction**, or active **colitis**. Use of medications that may impair renal perfusion or function may also increase risk. These include **diuretics**, **ACE inhibitors**, **angiotensin receptor blockers** (**ARBs**), and possibly **NSAIDs**. However, cases have occurred in patients with no identifiable risk factors. OsmoPrep®: Advise patients of the importance of following the recommended split dosage regimen and the importance of adequate hydration before, during and after the use of sodium phosphate, dibasic and sodium phosphate, monobasic. Avoid additional sodium phosphate-based purgative or enema products. **Visicol®**: It is important to use the dose and dosing regimen as recommended (pm/am split dose)..

Side effects requiring immediate medical attention

Along with its needed effects, sodium biphosphate / sodium phosphate may cause some unwanted effects. Although not all of these side effects may occur, if they do occur they may need medical attention.

Check with your doctor immediately if any of the following side effects occur while taking sodium biphosphate / sodium phosphate:

More common

- **Bloating**
- stomach pain

Incidence not known

- Agitation
- bloody or cloudy urine
- burning, crawling, itching, **numbness**, prickling, "pins and needles", or tingling feelings
- confusion
- cough
- decrease in the frequency or amount of urine
- decreased awareness or responsiveness
- **depression**
- difficult or labored breathing
- difficult or painful urination
- difficulty with swallowing
- **dizziness**

- fainting
- fast, slow, or **irregular heartbeat**
- **headache**
- **hives**, itching, **skin rash**
- hostility
- increased blood pressure
- increased thirst
- irritability
- large, hive-like swelling on the face, eyelids, lips, tongue, throat, hands, legs, feet, or genitals
- loss of appetite
- loss of consciousness
- lower back or side pain
- **muscle twitching**
- **nausea**
- noisy breathing
- puffiness or swelling of the eyelids or around the eyes, face, lips, or tongue
- rapid weight gain
- redness of the skin
- **seizures**
- severe sleepiness
- sudden decrease in the amount of urine
- swelling of the face, ankles, or hands
- tightness in the chest
- unusual drowsiness, dullness, tiredness, weakness, or feeling of sluggishness
- **vomiting**

Get emergency help immediately if any of the following symptoms of overdose occur while taking sodium biphosphate / sodium phosphate:

Symptoms of overdose

- Blurred vision
- chest pain or discomfort

- decreased frequency of urine
- dizziness, faintness, or lightheadedness when getting up suddenly from a lying or sitting position
- dry mouth
- increase in heart rate
- increased thirst
- lightheadedness
- loss of appetite
- lower back or side pain
- muscle cramps in the hands, arms, feet, legs, or face
- muscle pain
- pounding or rapid pulse
- rapid breathing
- restlessness
- stomach cramps
- sunken eyes
- sweating
- tremor
- weakness
- weight gain
- wrinkled skin

For Healthcare Professionals

Applies to sodium biphosphate / sodium phosphate: oral solution, oral tablet, rectal enema

General

The most common adverse events were **abdominal bloating**, nausea, **abdominal pain**, and vomiting.[Ref]

Gastrointestinal

Very common (10% or more): Bloating (39%), nausea (37%), abdominal pain (24%), vomiting (10%)[Ref]

Renal

Postmarketing reports: Renal impairment, increased blood urea nitrogen (BUN), increased creatinine, acute renal failure, acute phosphate nephropathy, nephrocalcinosis, renal tubular necrosis[Ref]

Nervous system

Postmarketing reports: Seizures[Ref]

Cardiovascular

Postmarketing reports: Arrhythmias[Ref]

Hypersensitivity

Postmarketing reports: Hypersensitivity reactions (including **anaphylaxis**, rash, **pruritus**, **urticaria**, throat tightness, bronchospasm, **dyspnea**, pharyngeal **edema**, **dysphagia**, paresthesia, swelling of the lips and tongue, and facial swelling)[Ref]

References

1. "Product Information. OsmoPrep (sodium biphosphate-sodium phosphate)." Valeant Pharmaceuticals, Costa Mesa, CA.

Further information

Always consult your healthcare provider to ensure the information displayed on this page applies to your personal circumstances.

Some side effects may not be reported. You may report them to the **FDA**.

Medical Disclaimer

Potassium chloride Side Effects:

Medically reviewed by Drugs.com. Last updated on Jul 25, 2020.

For the Consumer

*Applies to **potassium chloride**: oral tablet extended release*

Other dosage forms:

- **oral capsule extended release**
- **intravenous solution**
- **oral packet, oral solution**

What are some side effects that I need to call my doctor about right away?

WARNING/CAUTION: Even though it may be rare, some people may have very bad and sometimes deadly side effects when taking a drug. Tell your doctor or get medical help right away if you have any of the following signs or symptoms that may be related to a very bad side effect:

- Signs of an allergic reaction, like rash; **hives**; itching; red, swollen, blistered, or **peeling skin** with or without fever; wheezing; tightness in the chest or throat; trouble breathing, swallowing, or talking; unusual hoarseness; or swelling of the mouth, face, lips, tongue, or throat.
- Signs of a high potassium level like a heartbeat that does not feel normal; change in thinking clearly and with logic; feeling weak, lightheaded, or dizzy; feel like passing out; **numbness** or tingling; or shortness of breath.
- **Slow heartbeat**.
- Chest pain or pressure.
- Signs of bowel problems like black, tarry, or bloody stools; fever; mucus in the stools; throwing up blood or throw up that looks like coffee grounds; or very bad stomach pain, **constipation**, or **diarrhea**.
- Swelling of belly.

What are some other side effects of this drug?

All drugs may cause side effects. However, many people have no side effects or only have minor side effects. Call your doctor or get medical help if any of these side effects or any other side effects bother you or do not go away:

- Stomach pain or diarrhea.
- **Upset stomach** or throwing up.
- Gas.
- Some products of potassium are in a wax matrix; you may see this in stool. The potassium has been taken into the body, but the wax has not.

These are not all of the side effects that may occur. If you have questions about side effects, call your doctor. Call your doctor for medical advice about side effects.

You may report side effects to the FDA at 1-800-332-1088. You may also report side effects at https://www.fda.gov/medwatch.

For Healthcare Professionals

Applies to potassium chloride: compounding powder, intravenous solution, oral capsule extended release, oral granule extended release, oral liquid, oral powder for reconstitution, oral tablet, oral tablet extended release

Metabolic

Hyperkalemia can cause muscle weakness, paresthesia of the extremities, listlessness, mental confusion, flaccid paralysis, cold skin, grey pallor, peripheral vascular collapse, fall in blood pressure, paralysis, cardiac arrhythmias, and **heart block**. Electrocardiogram abnormalities include disappearance of the P-wave, widening and slurring of QRS complex, changes of the S-T segment, tall peaked T-waves. At extremely high concentrations (8 to 11 mmol/L) may cause death from cardiac **depression**, arrhythmias, or arrest.[Ref]

Frequency not reported: Hyperkalemia (including **cardiac arrest** as a manifestation), hypervolemia, **hyponatremia** and hyponatremic **encephalopathy**, **hypokalemia**[Ref]

Gastrointestinal

Frequency not reported: **Nausea**, **vomiting**, **flatulence**, **abdominal pain**/discomfort, diarrhea, obstruction, bleeding, ulceration, perforation, **gastrointestinal hemorrhage**, local irritation of the mucosa

Postmarketing reports: Delayed intestinal transit[Ref]

Local

Frequency not reported: Injection site pain, injection site phlebitis, infection at injection site, venous thrombosis extending from site of injection, extravasation[Ref]

Cardiovascular

Frequency not reported: Cardiac arrhythmias, cardiac arrest[Ref]

Dermatologic

Rare (less than 0.1%): **Skin rash**

Frequency not reported: **Urticaria**, **pruritus**[Ref]

Other

Frequency not reported: Febrile response[Ref]

Potassium phosphate Side Effects:

Medically reviewed by Drugs.com. Last updated on Oct 3, 2019.

- Overview
- Side Effects
- Dosage
- Professional
- Interactions
- More
- Professional

- Managing Side Effects

For the Consumer

*Applies to **potassium phosphate**: intravenous solution*

Side effects requiring immediate medical attention

Along with its needed effects, potassium phosphate may cause some unwanted effects. Although not all of these side effects may occur, if they do occur they may need medical attention.

Check with your doctor or nurse immediately if any of the following side effects occur while taking potassium phosphate:

Incidence not known

- Burning, crawling, itching, **numbness**, prickling, "pins and needles", or tingling feelings
- chest pain or discomfort
- confusion
- **dizziness**, faintness, or lightheadedness when getting up suddenly from a lying or sitting position
- fast, slow, or **irregular heartbeat**
- muscle cramps in the hands, arms, feet, legs, or face
- no muscle tone or movement
- numbness and tingling around the mouth, fingertips, or feet
- pounding or rapid pulse
- shortness of breath
- unusual tiredness or weakness
- weakness and heaviness of the legs

For Healthcare Professionals

Applies to potassium phosphate: intravenous solution, oral powder for reconstitution

Metabolic

Fluid retention was indicated by swelling feet or lower legs, or weight gain).

Hyperkalemia led to confusion, tiredness or weakness, irregular or **slow heart rate**, numbness or tingling around lips, hands or feet, unexplained **anxiety**, weakness or heaviness of legs, shortness of breath/trouble breathing.

Hypernatremia led to confusion, tiredness/weakness, convulsions, oliguria or decreased frequency of micturition, **tachycardia**, **headache**, dizziness, or increased thirst.

Hyperphosphatemia, **hypocalcemia**, or **hypomagnesemia** have led to convulsions, muscle cramps, numbness, tingling, pain or weakness in hands or feet, shortness of breath or troubled breathing, and tremor.

Potassium intoxication signs include paresthesias of the extremities, flaccid paralysis, listlessness, mental confusion, weakness and heaviness of the legs, fall in blood pressure, cardiac arrhythmias and **heart block**.

Hyperkalemia may cause electrocardiogram abnormalities (disappearance of the P-wave, widening and slurring of QRS complex, changes of the S-T segment, tall-peaked T-waves), **nausea**, **vomiting**, **diarrhea**, and abdominal discomfort.[Ref]

Uncommon (0.1% to 1%): Fluid retention, hyperkalemia, hypernatremia, hyperphosphatemia, hypocalcemia, hypomagnesemia, extraskeletal calcification as nephrocalcinosis (children with hypophosphatemic rickets treated with phosphate supplements)

Frequency not reported: Potassium intoxication[Ref]

Cardiovascular

Uncommon (0.1% to 1%): **Hypotension**

Rare (less than 0.1%): Myocardial infarction[Ref]

Renal

Rare (less than 0.1%): Acute renal failure[Ref]

References

1. Cerner Multum, Inc. "Australian Product Information." O 0

Further information

Always consult your healthcare provider to ensure the information displayed on this page applies to your personal circumstances.

Some side effects may not be reported. You may report them to the **FDA**.

Medical Disclaimer

Sodium chloride Side Effects:

Medically reviewed by Drugs.com. Last updated on Feb 18, 2020.

- Overview
- Side Effects
- Professional
- Interactions
- Images
- Q & A
- More
- **Managing Side Effects**

Applies to sodium chloride: oral tablet

Other dosage forms:

- **injection solution**

Side effects requiring immediate medical attention

Along with its needed effects, sodium chloride may cause some unwanted effects. Although not all of these side effects may occur, if they do occur they may need medical attention.

Check with your doctor immediately if any of the following side effects occur while taking sodium chloride:

Incidence not known

- Fast heartbeat
- fever
- hives, itching, or rash
- hoarseness
- irritation
- joint pain, stiffness, or swelling
- redness of the skin
- shortness of breath

- swelling of the eyelids, face, lips, hands, or feet
- tightness in the chest
- troubled breathing or swallowing

Further information

Always consult your healthcare provider to ensure the information displayed on this page applies to your personal circumstances.

Some side effects may not be reported. You may report them to the **FDA**.

Medical Disclaimer

Iron sucrose Side Effects:

Medically reviewed by Drugs.com. Last updated on Mar 6, 2020.

- Overview
- Side Effects
- Dosage
- Professional
- Interactions
- More
- Professional

- Managing Side Effects

In Summary

Commonly reported side effects of iron sucrose include: hypotension. See below for a comprehensive list of adverse effects.

For the Consumer

*Applies to **iron sucrose**: intravenous solution*

Side effects requiring immediate medical attention

Along with its needed effects, iron sucrose may cause some unwanted effects. Although not all of these side effects may occur, if they do occur they may need medical attention.

Check with your doctor or nurse immediately if any of the following side effects occur while taking iron sucrose:

More common

- **Bloating** or swelling of the face, arms, hands, lower legs, or feet
- blurred vision
- chest pain or tightness in the chest
- confusion
- difficult or labored breathing
- **dizziness**, faintness, or lightheadedness when getting up suddenly from a lying or sitting position
- **headache**
- nervousness
- pounding in the ears
- rapid weight gain
- slow or **fast heartbeat**
- sweating
- tingling of the hands or feet
- unusual tiredness or weakness
- unusual weight gain or loss

Less common

- Fever

Incidence not known

- Chest discomfort
- difficulty swallowing
- **hives** or itching
- increased sweating
- large, hive-like swelling on the face, eyelids, lips, tongue, throat, hands, legs, feet, or sex organs
- loss of consciousness
- noisy breathing
- slow or **irregular heartbeat**
- swelling of the joints

Side effects not requiring immediate medical attention

Some side effects of iron sucrose may occur that usually **do not need medical attention**. These side effects may go away during treatment as your body adjusts to the medicine. Also, your health care professional may be able to tell you about ways to prevent or reduce some of these side effects.

Check with your health care professional if any of the following side effects **continue or are bothersome** or if you have any questions about them:

More common

- Change in taste
- **diarrhea**
- muscle cramps
- **nausea** or **vomiting**
- pain in the arms or legs
- pain or burning sensation in the injection site

Less common

- Abdominal or stomach pain
- ankle, knee, or great toe joint pain
- body aches or pain
- chills
- difficulty with moving
- ear congestion or pain
- flushed, **dry skin**
- fruit-like breath odor
- increased hunger or thirst
- increased urination
- lack or loss of strength
- pain or redness at the injection site
- pale skin at the injection site
- **runny nose**, sneezing
- **sore throat**
- **unexplained weight loss**

Rare

- Burning, dry, or itching eyes
- discharge or excessive tearing
- redness, pain, or swelling of the eye, eyelid, or inner lining of the eyelid

For Healthcare Professionals

Applies to iron sucrose: intravenous solution

General

Symptoms associated with total dosage or infusing too rapidly include **hypotension**, **dyspnea**, headache, vomiting, nausea, dizziness, joint aches, paresthesia, abdominal and muscle pain, **edema**, and cardiovascular collapse; these symptoms have occurred up to 30 minutes after administration.

Cardiovascular

Very common (10% or more): Hypotension (39.4%)

Common (1% to 10%): Hypertension, arteriovenous fistula thrombosis

Postmarketing reports: Collapse, **bradycardia**, shock[Ref]

Musculoskeletal

Very common (10% or more): Muscle cramp (29.4%)

Common (1% to 10%): Arthralgia, **back pain**, myalgia, pain in extremity

Postmarketing reports: Swelling of the joints[Ref]

Gastrointestinal

Very common (10% or more): Nausea (14.7%)

Common (1% to 10%): **Abdominal pain**, diarrhea, vomiting

Uncommon (0.1% to 1%): Dysgeusia[Ref]

Nervous system

Very common (10% or more): Headache (12.6%)

Common (1% to 10%): Dizziness

Frequency not reported: Paresthesia

Postmarketing reports: Convulsions, light-headedness, loss of consciousness[Ref]

Respiratory

Common (1% to 10%): Cough, dyspnea, **nasal congestion**

Postmarketing reports: Bronchospasm[Ref]

Local

Common (1% to 10%): Infusion site pain or burning, extravasation

Frequency not reported: Injection site discoloration (after extravasation)[Ref]

Dermatologic

Common (1% to 10%): **Pruritus**, **angioedema**

Postmarketing reports: **Hyperhidrosis**[Ref]

Immunologic

Common (1% to 10%): **Conjunctivitis**, infections (nasopharyngitis, sinusitis, upper respiratory tract infections, **pharyngitis**), respiratory tract viral infection, peritonitis

Other

Common (1% to 10%): Ear pain, asthenia, chest pain, feeling abnormal, peripheral edema, pyrexia, graft complication

Frequency not reported: Edema[Ref]

Metabolic

Common (1% to 10%): Fluid overload, gout, hyperglycemia, **hypoglycemia**[Ref]

Hypersensitivity

Postmarketing reports: Anaphylactic-type reactions[Ref]

Genitourinary

Postmarketing reports: Chromaturia[Ref]

Psychiatric

Postmarketing reports: Confusion

References

1. "Product Information. Venofer (iron sucrose)" American Regent Laboratories Inc, Shirley, NY.

Further information

Always consult your healthcare provider to ensure the information displayed on this page applies to your personal circumstances.

Some side effects may not be reported. You may report them to the **FDA**.

Medical Disclaimer

Vaccine report from the UK:

1 REG 174 INFORMATION FOR UK HEALTHCARE PROFESSIONALS 2 Version 3.2 10/12/2020 This medicinal product does not have a UK marketing authorisation but has been given authorisation for temporary supply by the UK Department of Health and Social Care and the Medicines & Healthcare products Regulatory Agency for active immunization to prevent COVID-19 disease caused by SARS-CoV-2 virus in individuals aged 16 years of age and over. As with any new medicine in the UK, this product will be closely monitored to allow quick identification of new safety information. Healthcare professionals are asked to report any suspected adverse reactions. See section 4.8 for how to report adverse reactions. 1. NAME OF THE MEDICINAL PRODUCT COVID-19 mRNA Vaccine BNT162b2 concentrate for solution for injection 2. QUALITATIVE AND QUANTITATIVE COMPOSITION This is a multidose vial and must be diluted before use. 1 vial (0.45 mL) contains 5 doses of 30 micrograms of BNT162b2 RNA (embedded in lipid nanoparticles). COVID-19 mRNA Vaccine BNT162b2 is highly purified single-stranded, 5’-capped messenger RNA (mRNA) produced by cell-free in vitro transcription from the corresponding DNA templates, encoding the viral spike (S) protein of SARS-CoV-2. Excipients with known effect: For the

full list of excipients, see section 6.1. 3. PHARMACEUTICAL FORM Concentrate for solution for injection. The vaccine is a white to off-white frozen solution. 4. CLINICAL PARTICULARS 4.1 Therapeutic indications Active immunisation to prevent COVID-19 caused by SARS-CoV-2 virus, in individuals 16 years of age and older. The use of COVID-19 mRNA Vaccine BNT162b2 should be in accordance with official guidance. 4.2 Posology and method of administration Posology Individuals 16 years of age and older COVID-19 mRNA Vaccine BNT162b2 is administered intramuscularly after dilution as a series of two doses (0.3 mL each) 21 days apart (see section 5.1). There are no data available on the interchangeability of COVID-19 mRNA Vaccine BNT162b2 with other COVID-19 vaccines to complete the vaccination series. Individuals who have received one dose of COVID-19 mRNA Vaccine BNT162b2 should receive a second dose of COVID-19 mRNA Vaccine BNT162b2 to complete the vaccination series. Individuals may not be protected until at least 7 days after their second dose of the vaccine. 3 Version 3.2 10/12/2020 For further information on efficacy, see section 5.1. Paediatric population The safety and efficacy of COVID-19 mRNA Vaccine BNT162b2 in children under 16 years of age have not yet been established. Method of administration Administer the COVID-19 mRNA Vaccine BNT162b2 vaccine intramuscularly in the deltoid muscle after dilution. Do not inject the vaccine intravascularly, subcutaneously or intradermally. Preparation: The multidose vial is stored frozen and must be thawed prior to dilution. Frozen vials should be transferred to 2 °C to 8 °C to thaw. Alternatively, frozen vials may also be thawed and kept at temperatures up to 25 °C for a maximum of two hours in preparation for dilution for use. When removed from the freezer, the undiluted vaccine has a maximum shelf life of up to 5 days (120 hours) at 2 °C to 8 °C and an additional 2 hours at temperatures up to 25 °C in preparation for dilution. When the thawed vial is at room temperature gently invert 10 times prior to dilution. Do not shake. Prior to dilution the vaccine should present as an off-white solution with no particulates visible. Discard the vaccine if particulates or discolouration are present. The thawed vaccine must be diluted in its original vial with 1.8 mL sodium chloride 9 mg/mL (0.9%) solution for injection, using a 21 gauge or narrower needle and aseptic techniques. Warning: Unpreserved sodium chloride 9 mg/mL (0.9%) solution for injection is the only diluent that should be used. This diluent is not provided in the vaccine carton. 4 Version 3.2 10/12/2020 Equalise vial pressure before removing the needle from the vial by withdrawing 1.8 mL air into the empty diluent syringe. Gently invert the diluted solution 10 times. Do not shake. The diluted vaccine should present as an offwhite solution with no particulates visible. Discard the diluted vaccine if particulates or discolouration are present. The diluted vials should be marked with the dilution date and time and stored between 2 °C to 25 °C. Use as soon as practically possible, and within 6 hours after dilution. 5 Version 3.2 10/12/2020 After dilution, the vial contains 5 doses of 0.3 mL. Withdraw the required 0.3 mL dose of diluted vaccine using a sterile needle and syringe and administer. Any unused vaccine should be discarded 6 hours after dilution. The vaccine should not be shipped (transported) by motor vehicle after dilution away from the site of dilution. Any shipping (transportation) by motor vehicle after dilution of the vial is at the risk of the Health Care Professional. For instructions on disposal see section 6.6. 4.3 Contraindications Hypersensitivity to the active substance or to any of the excipients listed in section 6.1. 4.4 Special warnings and precautions for use Anaphylaxis Any person with a history of immediate-onset anaphylaxis to a vaccine, medicine or food should not receive the COVID-19 mRNA Vaccine BNT162b2. A second dose of the COVID-19 mRNA Vaccine BNT162b2 should not be given to those who have experienced anaphylaxis to the first dose of COVID-19 mRNA Vaccine BNT162b2. As with all injectable vaccines, appropriate medical treatment and supervision should always be readily available in case of a rare anaphylactic event following the administration of the vaccine. Traceability In order to improve the traceability of biological medicinal products, the name and the batch number of

the administered product should be clearly recorded. General recommendations The administration of COVID-19 mRNA Vaccine BNT162b2 should be postponed in individuals suffering from acute severe febrile illness. Individuals receiving anticoagulant therapy or those with a bleeding disorder that would contraindicate intramuscular injection, should not be given the vaccine unless the potential benefit clearly outweighs the risk of administration. Immunocompromised persons, including individuals receiving immunosuppressant therapy, may have a diminished immune response to the vaccine. No data are available about concomitant use of immunosuppressants. As with any vaccine, vaccination with COVID-19 mRNA Vaccine BNT162b2 may not protect all vaccine recipients. No data are available on the use of COVID-19 mRNA Vaccine BNT162b2 in persons that have previously received a full or partial vaccine series with another COVID-19 vaccine. 6 Version 3.2 10/12/2020 Excipient information This vaccine contains potassium, less than 1 mmol (39 mg) per dose, i.e. essentially 'potassium-free'. This vaccine contains less than 1 mmol sodium (23 mg) per dose, i.e. essentially 'sodium-free'. 4.5 Interaction with other medicinal products and other forms of interaction No interaction studies have been performed. Concomitant administration of COVID-19 mRNA Vaccine BNT162b2 with other vaccines has not been studied (see section 5.1). Do not mix COVID-19 mRNA Vaccine BNT162b2 with other vaccines/products in the same syringe. 4.6 Fertility, pregnancy and lactation Pregnancy There are no or limited amount of data from the use of COVID-19 mRNA Vaccine BNT162b2. Animal reproductive toxicity studies have not been completed. COVID-19 mRNA Vaccine BNT162b2 is not recommended during pregnancy. For women of childbearing age, pregnancy should be excluded before vaccination. In addition, women of childbearing age should be advised to avoid pregnancy for at least 2 months after their second dose. Breast-feeding It is unknown whether COVID-19 mRNA Vaccine BNT162b2 is excreted in human milk. A risk to the newborns/infants cannot be excluded. COVID-19 mRNA Vaccine BNT162b2 should not be used during breast-feeding. Fertility It is unknown whether COVID-19 mRNA Vaccine BNT162b2 has an impact on fertility. 4.7 Effects on ability to drive and use machines COVID-19 mRNA Vaccine BNT162b2 has no or negligible influence on the ability to drive and use machines. However, some of the adverse reactions mentioned under section 4.8 may temporarily affect the ability to drive or use machines. 4.8 Undesirable effects Summary of safety profile The safety of COVID-19 mRNA Vaccine BNT162b2 was evaluated in participants 16 years of age and older in two clinical studies conducted in the United States, Europe, Turkey, South Africa, and South America. Study BNT162-01 (Study 1) enrolled 60 participants, 18 through 55 years of age. Study C4591001 (Study 2) enrolled approximately 44,000 participants, 12 years of age or older. In Study 2, a total of 21,720 participants 16 years of age or older received at least one dose of COVID19 mRNA Vaccine BNT162b and 21,728 participants 16 years of age or older received placebo. Out of these, at the time of the analysis, 19,067 (9531 COVID-19 mRNA Vaccine BNT162b2 and 9536 placebo) were evaluated for safety 2 months after the second dose of COVID-19 mRNA Vaccine BNT162b2. Demographic characteristics were generally similar with regard to age, gender, race and ethnicity among participants who received COVID-19 mRNA Vaccine and those who received placebo. Overall, among the participants who received COVID-19 mRNA Vaccine BNT162b2, 51.5% were male and 48.5% were female, 82.1% were White, 9.6% were Black or African American, 26.1% were Hispanic/Latino, 4.3% were Asian and 0.7% were Native American/Alaskan native. 7 Version 3.2 10/12/2020 The most frequent adverse reactions in participants 16 years of age and older were pain at the injection site (> 80%), fatigue (> 60%), headache (> 50%), myalgia (> 30%), chills (> 30%), arthralgia (> 20%) and pyrexia (> 10%) and were usually mild or moderate in intensity and resolved within a few days after vaccination. If required, symptomatic treatment with analgesic and/or anti-pyretic medicinal products (e.g. paracetamol-containing products) may be used. Adverse reactions

from clinical studies Adverse reactions reported in clinical studies are listed in this section per MedDRA system organ class, in decreasing order of frequency and seriousness. The frequency is defined as follows: very common (≥ 1/10), common (≥ 1/100 to < 1/10), uncommon (≥ 1/1,000 to < 1/100), rare (≥ 1/10,000 to < 1/1,000), very rare (< 1/10,000), not known (cannot be estimated from available data). Blood and lymphatic system disorders Uncommon: Lymphadenopathy Nervous system disorders Very common: Headache Musculoskeletal and connective tissue disorders Very common: Arthralgia; myalgia General disorders and administration site conditions Very common: Injection-site pain; fatigue; chills; pyrexia Common: Redness at injection site; injection site swelling Uncommon: Malaise Gastrointestinal disorders Common Nausea Reporting of suspected adverse reactions Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the Coronavirus Yellow Card reporting site https://coronavirus-yellowcard.mhra.gov.uk/ or search for MHRA Yellow Card in the Google Play or Apple App Store and include the vaccine brand and batch/Lot number if available. 4.9 Overdose Participants who received 58 micrograms of COVID-19 mRNA Vaccine in clinical trials did not report an increase in reactogenicity or adverse events. In the event of overdose, monitoring of vital functions and possible symptomatic treatment is recommended. 5. PHARMACODYNAMIC PROPERTIES 5.1 Pharmacodynamic properties Pharmacotherapeutic group: {group}, ATC code: not yet assigned Mechanism of action The nucleoside-modified messenger RNA in COVID-19 mRNA Vaccine BNT162b2 is formulated in lipid nanoparticles, which enable delivery of the RNA into host cells to allow expression of the SARS- 8 Version 3.2 10/12/2020 CoV-2 S antigen. The vaccine elicits both neutralizing antibody and cellular immune responses to the spike (S) antigen, which may contribute to protection against COVID-19 disease. Efficacy in participants 16 years of age and older The efficacy of COVID-19 mRNA Vaccine BNT162b2 was evaluated in participants 16 years of age and older in two clinical studies conducted in the United States, Europe, Turkey, South Africa and South America. Study 1 enrolled 60 participants, 18 through 55 years of age. Study 2 is a multicentre, placebo-controlled efficacy study in participants 12 years of age and older. Randomisation was stratified by age: 12 through 15 years of age, 16 through 55 years of age, or 56 years of age and older, with a minimum of 40% of participants in the ≥ 56-year stratum. The study excluded participants who were immunocompromised and those who had previous clinical or microbiological diagnosis of COVID-19 disease. Participants with pre-existing stable disease, defined as disease not requiring significant change in therapy or hospitalization for worsening disease during the 6 weeks before enrolment, were included as were participants with known stable infection with human immunodeficiency virus (HIV), hepatitis C virus (HCV) or hepatitis B virus (HBV). There was no requirement for prophylactic use of paracetamol or analgesics. Influenza vaccines could be administered outside a window ± 14 days of the vaccine doses. In Study 2, approximately 44,000 participants 12 years of age and older were randomised equally and received 2 doses of COVID-19 mRNA Vaccine or placebo with a planned interval of 21 days. The efficacy analyses included participants that received their second vaccination within 19 to 42 days after their first vaccination. Participants are planned to be followed for up to 24 months, for assessments of safety and efficacy against COVID-19 disease. The population for the analysis of the primary efficacy endpoint included, 36,621 participants 12 years of age and older (18,242 in the COVID-19 mRNA Vaccine group and 18,379 in the placebo group) who did not have evidence of prior infection with SARS-CoV-2 through 7 days after the second dose. Demographic characteristics were generally similar with regard to age, gender, race and ethnicity among participants who received COVID-19 mRNA BNT162b2 vaccine and those who received placebo. Overall, among the

participants who received COVID-19 mRNA vaccine, 51.1% were male and 48.9% were female, 82.8% were White, 8.9% were Black or African American, 26.8% were Hispanic/Latino, 4.5% were Asian and 0.6% were Native American/Alaskan native. 57.2% were aged 16-55 years, 42.6% were aged > 55 years and 21.8% were ≥ 65 years. Efficacy against COVID-19 disease At the time of the analysis of Study 2, information presented is based on participants 16 years and older. Participants had been followed for symptomatic COVID-19 disease for at least 2,214 person-years for the COVID-19 mRNA Vaccine and at least 2,222 person-years in the placebo group. There were 8 confirmed COVID-19 cases identified in the COVID-19 mRNA Vaccine group and 162 cases in the placebo group, respectively. In this analysis, compared to placebo, efficacy of COVID-19 mRNA Vaccine BNT162b2 from first COVID-19 occurrence from 7 days after Dose 2 in participants without evidence of prior infection with SARS-CoV-2 was 95.0% (95% credible interval of 90.3% to 97.6%). In participants 65 years of age and older and 75 years of age and older without evidence of prior infections with SARS-CoV-2, efficacy of COVID-19 mRNA Vaccine BNT162b2 was 94.7% (two-sided 95% confidence interval of 66.7% to 99.9%) and 100% (two-sided 95% confidence interval of -13.1% to 100.0%) respectively. In a separate analysis, compared to placebo, efficacy of COVID-19 mRNA Vaccine from first COVID-19 occurrence from 7 days after Dose 2 in participants with or without evidence of prior infection with SARS-CoV-2 was 94.6% (95% credible interval of 89.9% to 97.3%). There were no meaningful clinical differences in overall vaccine efficacy in participants who were at risk of severe COVID-19 disease including those with one or more comorbidities that increase the risk 9 Version 3.2 10/12/2020 of severe COVID-19 disease (e.g. asthma, BMI ≥ 30 kg/m2 , chronic pulmonary disease, diabetes mellitus, hypertension). Confirmed cases were determined by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) and at least 1 symptom consistent with COVID-19 disease*. *Case definition (at least 1 of): fever, new or increased cough, new or increased shortness of breath; chills, new or increased muscle pain, new loss of taste or smell, sore throat, diarrhoea or vomiting. 5.2 Pharmacokinetic properties Not applicable. 5.3 Preclinical safety data Non-clinical data reveal no special hazard for humans based on a conventional study of repeat dose toxicity. Animal studies into potential toxicity to reproduction and development have not been completed. 6. PHARMACEUTICAL PARTICULARS 6.1 List of excipients This vaccine contains polyethylene glycol/macrogol (PEG) as part of ALC-0159. ALC-0315 = (4-hydroxybutyl) azanediyl)bis (hexane-6,1-diyl)bis(2-hexyldecanoate), ALC-0159 = 2-[(polyethylene glycol)-2000]-N,N-ditetradecylacetamide, 1,2-Distearoyl-sn-glycero-3-phosphocholine, cholesterol, potassium chloride, potassium dihydrogen phosphate, sodium chloride, disodium hydrogen phosphate dihydrate, sucrose, water for injections 6.2 Incompatibilities In the absence of compatibility studies, this medicinal product must not be mixed with other medicinal products. 6.3 Shelf life 6 months at -80 °C to -60 °C. 6.4 Special precautions for storage Store in a freezer at -80 °C to -60 °C. Store in the thermal container at -90 ºC to -60 ºC. Store in the original package in order to protect from light. Once removed from the freezer, the undiluted vaccine can be stored for up to 5 days at 2 °C to 8 °C, and up to 2 hours at temperatures up to 25 °C, prior to use. During storage, minimise exposure to room 10 Version 3.2 10/12/2020 light, and avoid exposure to direct sunlight and ultraviolet light. Thawed vials can be handled in room light conditions. After dilution, store the vaccine at 2 °C to 25 °C and use as soon as practically possible and within 6 hours. The vaccine does not contain a preservative. Discard any unused vaccine. Once diluted, the vials should be marked with the dilution time and discarded within 6 hours of dilution. Once thawed, the vaccine cannot be re-frozen. 6.5 Nature and contents of container Concentrate for solution for injection for 5 doses in a 2 mL clear vial (type I glass) with a stopper (bromobutyl) and a flip-off plastic cap with aluminium seal. Pack size: 195 vials 6.6 Special precautions for disposal and other handling When removed from the freezer,

the vaccine has a maximum possible shelf life of up to 5 days when stored at 2-8 ºC (label to be added once box removed from freezer). A 195 vial pack may take 3 hours to thaw at 2-8 oC. The product can alternatively be defrosted and kept for up to 2 hours at up to 25 ºC before being diluted for use. This facilitates immediate thaw and use when removed directly from the freezer to 25 ºC. In this instance the product is to be diluted within 2 hours of removing from the freezer. Once thawed, the vaccine cannot be refrozen. After dilution the vaccine should be used as soon as is practically possible and within 6 hours of dilution; it can be stored at 2-25 ºC during this period. From a microbiological point of view, it would not normally be considered good practice to store a diluted unpreserved multi-use product for 6 hours before being administered. The product would ideally be used as soon as practically possible after dilution. The vaccine does not contain a preservative. Discard any unused vaccine. Any unused medicinal product or waste material should be disposed of in accordance with local requirements. For instructions on dose preparation of the medicinal product before administration, see section 4.2. 7. MARKETING AUTHORISATION HOLDER Not applicable. 8. MARKETING AUTHORISATION NUMBER(S) Not applicable. 11 Version 3.2 10/12/2020 9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION Not applicable. 10. DATE OF REVISION OF THE TEXT 10/12/2020