

1 **HIGHLIGHTS OF PRESCRIBING INFORMATION**
2 **These highlights do not include all the information needed to use**
3 **VELCADE safely and effectively. See full prescribing information**
4 **for VELCADE.**
5
6 **VELCADE® (bortezomib) for Injection**
7 **Initial U.S. Approval: 2003**
8 -----**RECENT MAJOR CHANGES**-----
9 Dosage and Administration (2.5) 12/2009
10 Warnings and Precautions, Hepatic Impairment (5.11) 12/2009
11 Patients with Hepatic Impairment (8.7) 12/2009
12 Clinical Studies, Multiple Myeloma (14.1) 12/2009
13 -----**INDICATIONS AND USAGE**-----
14 VELCADE is a proteasome inhibitor indicated for:
15 • treatment of patients with multiple myeloma (1.1)
16 • treatment of patients with mantle cell lymphoma who have received at
17 least 1 prior therapy (1.2)
18 -----**DOSAGE AND ADMINISTRATION**-----
19 The recommended dose of VELCADE is 1.3 mg/m² administered as a 3
20 to 5 second bolus intravenous injection. (2.1, 2.3)
21 Dose adjustment may be used to manage adverse events that occur
22 during treatment (2.2, 2.4)
23 -----**DOSAGE FORMS AND STRENGTHS**-----
24 • 1 single use vial contains 3.5 mg of bortezomib. Dose must be
25 individualized to prevent overdose. (3)
26 -----**CONTRAINDICATIONS**-----
27 • VELCADE is contraindicated in patients with hypersensitivity to
28 bortezomib, boron, or mannitol. (4)
29 -----**WARNINGS AND PRECAUTIONS**-----
30 • Women should avoid becoming pregnant while being treated with
31 VELCADE. Pregnant women should be apprised of the potential
32 harm to the fetus. (5.1, 8.1)
33 • Peripheral neuropathy, including severe cases, may occur - manage
34 with dose modification or discontinuation. (2.2, 2.4) Patients with
35 preexisting severe neuropathy should be treated with VELCADE only
36 after careful risk-benefit assessment. (2.2, 2.4, 5.2)

37 • Hypotension can occur. Caution should be used when treating
38 patients receiving antihypertensives, those with a history of syncope,
39 and those who are dehydrated. (5.3)
40 • Patients with risk factors for, or existing heart disease, should be
41 closely monitored. (5.4)
42 • Acute diffuse infiltrative pulmonary disease has been reported. (5.5)
43 • Nausea, diarrhea, constipation, and vomiting have occurred and may
44 require use of antiemetic and antidiarrheal medications or fluid
45 replacement. (5.7)
46 • Thrombocytopenia or neutropenia can occur; complete blood counts
47 should be regularly monitored throughout treatment. (5.8)
48 • Tumor Lysis Syndrome (5.9), Reversible Posterior
49 Leukoencephalopathy Syndrome (5.6), and acute hepatic failure
50 (5.10) have been reported.
51 -----**ADVERSE REACTIONS**-----
52 Most commonly reported adverse reactions (incidence ≥30%) in
53 clinical studies include asthenic conditions, diarrhea, nausea,
54 constipation, peripheral neuropathy, vomiting, pyrexia,
55 thrombocytopenia, psychiatric disorders, anorexia and decreased
56 appetite, neutropenia, neuralgia, leukopenia and anemia. Other
57 adverse reactions, including serious adverse reactions, have been
58 reported. (6.1)
59 **To report SUSPECTED ADVERSE REACTIONS, contact**
60 **Millennium Pharmaceuticals at 1-866 VELCADE or FDA at 1-**
61 **800-FDA-1088 or www.fda.gov/medwatch.**
62 -----**USE IN SPECIFIC POPULATIONS**-----
63 • Women should be advised against breast feeding or becoming
64 pregnant while being treated with VELCADE. (5.1, 8.1, 8.3)
65 • Patients with diabetes may require close monitoring of blood
66 glucose and adjustment of anti-diabetic medication. (8.8)
67 • Hepatic Impairment: In patients with moderate or severe hepatic
68 impairment, use a lower starting dose (2.5, 5.11, 8.7, 12.3)
69 **See 17 for PATIENT COUNSELING INFORMATION.**
70 **Revised: [12/2010]**

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130 are not listed

131 **FULL PRESCRIBING INFORMATION**

132 **1 INDICATIONS AND USAGE**

133 **1.1 Multiple Myeloma**

134 VELCADE® (bortezomib) for Injection is indicated for the treatment of patients with multiple
135 myeloma.

136 **1.2 Mantle Cell Lymphoma**

137 VELCADE (bortezomib) for Injection is indicated for the treatment of patients with mantle cell
138 lymphoma who have received at least 1 prior therapy.

139 **2 DOSAGE AND ADMINISTRATION**

140 **2.1 Dosage in Previously Untreated Multiple Myeloma**

141 VELCADE (bortezomib) is administered as a 3-5 second bolus IV injection in combination with
142 oral melphalan and oral prednisone for nine 6-week treatment cycles as shown in Table 1. In
143 Cycles 1-4, VELCADE is administered twice weekly (days 1, 4, 8, 11, 22, 25, 29 and 32). In
144 Cycles 5-9, VELCADE is administered once weekly (days 1, 8, 22 and 29). At least 72 hours
145 should elapse between consecutive doses of VELCADE.

146 **Table 1-Dosage Regimen for Patients with Previously Untreated Multiple Myeloma**

Twice Weekly VELCADE (Cycles 1-4)												
Week	1				2		3	4		5		6
VELCADE (1.3 mg/m ²)	Day 1	--	--	Day 4	Day 8	Day 11	rest period	Day 22	Day 25	Day 29	Day 32	rest period
Melphalan(9 mg/m ²) Prednisone(60 mg/m ²)	Day 1	Day 2	Day 3	Day 4	--	--	rest period	--	--	--	--	rest period
Once Weekly VELCADE (Cycles 5-9 when used in combination with Melphalan and Prednisone)												
Week	1				2		3	4		5		6
VELCADE (1.3 mg/m ²)	Day 1	--	--		Day 8		rest period	Day 22		Day 29		rest period
Melphalan(9 mg/m ²) Prednisone(60 mg/m ²)	Day 1	Day 2	Day 3	Day 4	--	--	rest period	--	--	--	--	rest period

147
148 **2.2 Dose Modification Guidelines for Combination Therapy with VELCADE, Melphalan**
149 **and Prednisone**

150 Prior to initiating any cycle of therapy with VELCADE in combination with melphalan and
151 prednisone:

- 152 • Platelet count should be $\geq 70 \times 10^9/L$ and the ANC should be $\geq 1.0 \times 10^9/L$
- 153 • Non-hematological toxicities should have resolved to Grade 1 or baseline

154

155 **Table 2-Dose Modifications During Cycles of Combination VELCADE, Melphalan and**
156 **Prednisone Therapy**

Toxicity	Dose modification or delay
Hematological toxicity during a cycle:	
If prolonged Grade 4 neutropenia or thrombocytopenia, or thrombocytopenia with bleeding is observed in the previous cycle	Consider reduction of the melphalan dose by 25% in the next cycle
If platelet count $\leq 30 \times 10^9/L$ or ANC $\leq 0.75 \times 10^9/L$ on a VELCADE dosing day (other than day 1)	VELCADE dose should be withheld
If several VELCADE doses in consecutive cycles are withheld due to toxicity	VELCADE dose should be reduced by 1 dose level (from 1.3 mg/m^2 to 1 mg/m^2 , or from 1 mg/m^2 to 0.7 mg/m^2)
Grade ≥ 3 non-hematological toxicities	VELCADE therapy should be withheld until symptoms of the toxicity have resolved to Grade 1 or baseline. Then, VELCADE may be reinitiated with one dose level reduction (from 1.3 mg/m^2 to 1 mg/m^2 , or from 1 mg/m^2 to 0.7 mg/m^2). For VELCADE-related neuropathic pain and/or peripheral neuropathy, hold or modify VELCADE as outlined in Table 3.

157 For information concerning melphalan and prednisone, see manufacturer's prescribing
158 information.

159

160 **2.3 Dosage in Relapsed Multiple Myeloma and Mantle Cell Lymphoma**

161 VELCADE ($1.3 \text{ mg/m}^2/\text{dose}$) is administered as a 3 to 5 second bolus intravenous injection
162 twice weekly for 2 weeks (Days 1, 4, 8, and 11) followed by a 10-day rest period (Days 12-21).
163 For extended therapy of more than 8 cycles, VELCADE may be administered on the standard
164 schedule or on a maintenance schedule of once weekly for 4 weeks (Days 1, 8, 15, and 22)
165 followed by a 13-day rest period (Days 23 to 35) [*see Clinical Studies section (14) for a*
166 *description of dose administration during the trials*]. At least 72 hours should elapse between
167 consecutive doses of VELCADE.

168 **2.4 Dose Modification Guidelines for Relapsed Multiple Myeloma and Mantle Cell**
169 **Lymphoma**

170 VELCADE therapy should be withheld at the onset of any Grade 3 non-hematological or Grade
171 4 hematological toxicities excluding neuropathy as discussed below [*see Warnings and*
172 *Precautions (5)*]. Once the symptoms of the toxicity have resolved, VELCADE therapy may be
173 reinitiated at a 25% reduced dose ($1.3 \text{ mg/m}^2/\text{dose}$ reduced to $1 \text{ mg/m}^2/\text{dose}$; $1 \text{ mg/m}^2/\text{dose}$
174 reduced to $0.7 \text{ mg/m}^2/\text{dose}$).

175 For the management of patients who experience VELCADE related neuropathic pain and/or
176 peripheral neuropathy see Table 3. Patients with preexisting severe neuropathy should be treated
177 with VELCADE only after careful risk-benefit assessment.

178 **Table 3: Recommended Dose Modification for VELCADE related Neuropathic Pain**
179 **and/or Peripheral Sensory or Motor Neuropathy**

Severity of Peripheral Neuropathy Signs and Symptoms	Modification of Dose and Regimen
Grade 1 (paresthesias, weakness and/or loss of reflexes) without pain or loss of function	No action
Grade 1 with pain or Grade 2 (interfering with function but not with activities of daily living)	Reduce VELCADE to 1 mg/m ²
Grade 2 with pain or Grade 3 (interfering with activities of daily living)	Withhold VELCADE therapy until toxicity resolves. When toxicity resolves reinstitute with a reduced dose of VELCADE at 0.7 mg/m ² and change treatment schedule to once per week.
Grade 4 (sensory neuropathy which is disabling or motor neuropathy that is life threatening or leads to paralysis)	Discontinue VELCADE

180 Grading based on NCI Common Toxicity Criteria CTCAE v3.0

181 **2.5 Dosage in Patients with Hepatic Impairment**

182 Patients with mild hepatic impairment do not require a starting dose adjustment and should be
183 treated per the recommended VELCADE dose. Patients with moderate or severe hepatic
184 impairment should be started on VELCADE at a reduced dose of 0.7 mg/m² per injection during
185 the first cycle, and a subsequent dose escalation to 1.0 mg/m² or further dose reduction to 0.5
186 mg/m² may be considered based on patient tolerance (see **Table 4**). [*see Warnings and*
187 *Precautions (5.11), Use in Specific Populations (8.7) and Clinical Pharmacology (12.3)*]
188

189 **Table 4: Recommended Starting Dose Modification for VELCADE in Patients with**
190 **Hepatic Impairment**

	Bilirubin Level	SGOT (AST) Levels	Modification of Starting Dose
Mild	≤ 1.0x ULN	> ULN	None
	> 1.0x–1.5x ULN	Any	None
Moderate	> 1.5x–3x ULN	Any	Reduce VELCADE to 0.7 mg/m ² in the first cycle. Consider dose escalation to 1.0 mg/m ² or further dose reduction to 0.5 mg/m ² in subsequent cycles based on patient tolerability.
Severe	> 3x ULN	Any	

191 Abbreviations: SGOT = serum glutamic oxaloacetic transaminase;
192 AST = aspartate aminotransferase; ULN = upper limit of the normal range.
193

194 **2.6 Administration Precautions**

195 The drug quantity contained in one vial (3.5 mg) may exceed the usual dose required. Caution
196 should be used in calculating the dose to prevent overdose.

197 VELCADE is an antineoplastic. Procedures for proper handling and disposal should be
198 considered. [*see How Supplied/Storage and Handling (16)*]

199 In clinical trials, local skin irritation was reported in 5% of patients, but extravasation of
200 VELCADE was not associated with tissue damage.

201 **2.7 Reconstitution/Preparation for Intravenous Administration**

202 Proper aseptic technique should be used. Reconstitute with 3.5 mL of 0.9% Sodium Chloride
203 resulting in a final concentration of 1 mg/mL of bortezomib. The reconstituted product should
204 be a clear and colorless solution.

205 Parenteral drug products should be inspected visually for particulate matter and discoloration
206 prior to administration whenever solution and container permit. If any discoloration or
207 particulate matter is observed, the reconstituted product should not be used.

208 **Stability:** Unopened vials of VELCADE are stable until the date indicated on the package when
209 stored in the original package protected from light.

210 VELCADE contains no antimicrobial preservative. Reconstituted VELCADE should be
211 administered within 8 hours of preparation. When reconstituted as directed, VELCADE may be
212 stored at 25°C (77°F). The reconstituted material may be stored in the original vial and/or the
213 syringe prior to administration. The product may be stored for up to 8 hours in a syringe;
214 however total storage time for the reconstituted material must not exceed 8 hours when exposed
215 to normal indoor lighting.

216 **3 DOSAGE FORMS AND STRENGTHS**

217 Each single use vial of VELCADE contains 3.5 mg of bortezomib as a sterile lyophilized
218 powder.

219 **4 CONTRAINDICATIONS**

220 VELCADE is contraindicated in patients with hypersensitivity to bortezomib, boron, or
221 mannitol.

222 **5 WARNINGS AND PRECAUTIONS**

223 VELCADE should be administered under the supervision of a physician experienced in the use
224 of antineoplastic therapy. Complete blood counts (CBC) should be monitored frequently during
225 treatment with VELCADE.

226 **5.1 Use in Pregnancy**

227 **Pregnancy Category D**

228 Women of childbearing potential should avoid becoming pregnant while being treated with
229 VELCADE. Bortezomib administered to rabbits during organogenesis at a dose approximately
230 0.5 times the clinical dose of 1.3 mg/m² based on body surface area caused post-implantation
231 loss and a decreased number of live fetuses. [*see Use in Specific Populations (8.1)*]

232 **5.2 Peripheral Neuropathy**

233 VELCADE treatment causes a peripheral neuropathy that is predominantly sensory. However,
234 cases of severe sensory and motor peripheral neuropathy have been reported. Patients with pre-
235 existing symptoms (numbness, pain or a burning feeling in the feet or hands) and/or signs of
236 peripheral neuropathy may experience worsening peripheral neuropathy (including ≥Grade 3)

237 during treatment with VELCADE. Patients should be monitored for symptoms of neuropathy,
238 such as a burning sensation, hyperesthesia, hypoesthesia, paresthesia, discomfort, neuropathic
239 pain or weakness. Patients experiencing new or worsening peripheral neuropathy may require
240 change in the dose and schedule of VELCADE [see *Dosage and Administration (2.2, 2.4)*].
241 Following dose adjustments, improvement in or resolution of peripheral neuropathy was reported
242 in 51% of patients with \geq Grade 2 peripheral neuropathy in the relapsed multiple myeloma study.
243 Improvement in or resolution of peripheral neuropathy was reported in 73% of patients who
244 discontinued due to Grade 2 neuropathy or who had \geq Grade 3 peripheral neuropathy in the phase
245 2 multiple myeloma studies [see *Adverse Reactions (6)*]. The long-term outcome of peripheral
246 neuropathy has not been studied in mantle cell lymphoma.

247 **5.3 Hypotension**

248 The incidence of hypotension (postural, orthostatic, and hypotension NOS) was 13%. These
249 events are observed throughout therapy. Caution should be used when treating patients with a
250 history of syncope, patients receiving medications known to be associated with hypotension, and
251 patients who are dehydrated. Management of orthostatic/postural hypotension may include
252 adjustment of antihypertensive medications, hydration, and administration of mineralocorticoids
253 and/or sympathomimetics. [see *Adverse Reactions(6)*]

254 **5.4 Cardiac Disorders**

255 Acute development or exacerbation of congestive heart failure and new onset of decreased left
256 ventricular ejection fraction have been reported, including reports in patients with no risk factors
257 for decreased left ventricular ejection fraction. Patients with risk factors for, or existing heart
258 disease should be closely monitored. In the relapsed multiple myeloma study, the incidence of
259 any treatment-emergent cardiac disorder was 15% and 13% in the VELCADE and
260 dexamethasone groups, respectively. The incidence of heart failure events (acute pulmonary
261 edema, cardiac failure, congestive cardiac failure, cardiogenic shock, pulmonary edema) was
262 similar in the VELCADE and dexamethasone groups, 5% and 4%, respectively. There have
263 been isolated cases of QT-interval prolongation in clinical studies; causality has not been
264 established.

265 **5.5 Pulmonary Disorders**

266 There have been reports of acute diffuse infiltrative pulmonary disease of unknown etiology such
267 as pneumonitis, interstitial pneumonia, lung infiltration and Acute Respiratory Distress
268 Syndrome (ARDS) in patients receiving VELCADE. Some of these events have been fatal.

269 In a clinical trial, the first two patients given high-dose cytarabine ($2\text{g}/\text{m}^2$ per day) by continuous
270 infusion with daunorubicin and VELCADE for relapsed acute myelogenous leukemia died of
271 ARDS early in the course of therapy.

272 There have been reports of pulmonary hypertension associated with VELCADE administration
273 in the absence of left heart failure or significant pulmonary disease.

274 In the event of new or worsening cardiopulmonary symptoms, a prompt comprehensive
275 diagnostic evaluation should be conducted.

276 **5.6 Reversible Posterior Leukoencephalopathy Syndrome (RPLS)**

277 There have been reports of RPLS in patients receiving VELCADE. RPLS is a rare, reversible,
278 neurological disorder which can present with seizure, hypertension, headache, lethargy,
279 confusion, blindness, and other visual and neurological disturbances. Brain imaging, preferably

280 MRI (Magnetic Resonance Imaging), is used to confirm the diagnosis. In patients developing
281 RPLS, discontinue VELCADE. The safety of reinitiating VELCADE therapy in patients
282 previously experiencing RPLS is not known.

283 5.7 Gastrointestinal Adverse Events

284 VELCADE treatment can cause nausea, diarrhea, constipation, and vomiting [*see Adverse*
285 *Reactions (6)*] sometimes requiring use of antiemetic and antidiarrheal medications. Ileus can
286 occur. Fluid and electrolyte replacement should be administered to prevent dehydration.

287 5.8 Thrombocytopenia/Neutropenia

288 VELCADE is associated with thrombocytopenia and neutropenia that follow a cyclical pattern
289 with nadirs occurring following the last dose of each cycle and typically recovering prior to
290 initiation of the subsequent cycle. The cyclical pattern of platelet and neutrophil decreases and
291 recovery remained consistent over the 8 cycles of twice weekly dosing, and there was no
292 evidence of cumulative thrombocytopenia or neutropenia. The mean platelet count nadir
293 measured was approximately 40% of baseline. The severity of thrombocytopenia related to
294 pretreatment platelet count is shown in **Table 5**. In the relapsed multiple myeloma study, the
295 incidence of significant bleeding events (\geq Grade 3) was similar on both the VELCADE (4%) and
296 dexamethasone (5%) arms. Platelet count should be monitored prior to each dose of VELCADE.
297 Patients experiencing thrombocytopenia may require change in the dose and schedule of
298 VELCADE [*see Table 2 and Dosage and Administration (2.4)*]. There have been reports of
299 gastrointestinal and intracerebral hemorrhage in association with VELCADE. Transfusions may
300 be considered. The incidence of febrile neutropenia was <1%.

301 **Table 5: Severity of Thrombocytopenia Related to Pretreatment Platelet Count in the**
302 **Relapsed Multiple Myeloma Study**

Pretreatment Platelet Count*	Number of Patients (N=331)**	Number (%) of Patients with Platelet Count <10,000/ μ L	Number (%) of Patients with Platelet Count 10,000-25,000/ μ L
\geq 75,000/ μ L	309	8 (3%)	36 (12%)
\geq 50,000/ μ L- <75,000/ μ L	14	2 (14%)	11 (79%)
\geq 10,000/ μ L- <50,000/ μ L	7	1 (14%)	5 (71%)

303 * A baseline platelet count of 50,000/ μ L was required for study eligibility

304 ** Data were missing at baseline for 1 patient

305 5.9 Tumor Lysis Syndrome

306 Because VELCADE is a cytotoxic agent and can rapidly kill malignant cells, the complications
307 of tumor lysis syndrome may occur. Patients at risk of tumor lysis syndrome are those with high
308 tumor burden prior to treatment. These patients should be monitored closely and appropriate
309 precautions taken.

310 5.10 Hepatic Events

311 Cases of acute liver failure have been reported in patients receiving multiple concomitant
312 medications and with serious underlying medical conditions. Other reported hepatic events
313 include increases in liver enzymes, hyperbilirubinemia, and hepatitis. Such changes may be

314 reversible upon discontinuation of VELCADE. There is limited re-challenge information in
315 these patients.

316 **5.11 Patients with Hepatic Impairment:**

317 Bortezomib is metabolized by liver enzymes. Bortezomib exposure is increased in patients with
318 moderate or severe hepatic impairment; these patients should be treated with VELCADE at
319 reduced starting doses and closely monitored for toxicities. [*see Dosage and Administration*
320 *(2.5), Use In Specific Populations (8.7) and Clinical Pharmacology (12.3)*]

321 **6 ADVERSE REACTIONS**

322 The following adverse reactions are also discussed in other sections of the labeling:

- 323 • Peripheral Neuropathy [*see Warnings and Precautions (5.2); Dosage and*
324 *Administration (Table 3)*]
- 325 • Hypotension [*see Warnings and Precautions (5.3)*]
- 326 • Cardiac Disorders [*see Warnings and Precautions (5.4)*]
- 327 • Pulmonary Disorders [*see Warnings and Precautions (5.5)*]
- 328 • Reversible Posterior Leukoencephalopathy Syndrome (RPLS) [*see Warnings and*
329 *Precautions (5.6)*]
- 330 • Gastrointestinal Adverse Events [*see Warnings and Precautions (5.7)*]
- 331 • Thrombocytopenia/Neutropenia [*see Warnings and Precautions (5.8)*]
- 332 • Tumor Lysis Syndrome [*see Warnings and Precautions (5.9)*]
- 333 • Hepatic Events [*see Warnings and Precautions (5.10)*]

334 **6.1 Clinical Trials Safety Experience**

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

338 **Summary of Clinical Trial in Patients with Previously Untreated Multiple Myeloma:**

339

340 Table 6 describes safety data from 340 patients with previously untreated multiple myeloma who
341 received VELCADE (1.3 mg/m²) in combination with melphalan (9 mg/m²) and prednisone
342 (60 mg/m²) in a prospective randomized study.

343 The safety profile of VELCADE in combination with melphalan/prednisone is consistent with
344 the known safety profiles of both VELCADE and melphalan/prednisone.

345

346
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Table 6-Most Commonly Reported Adverse Events (≥ 10% in VELCADE, Melphalan and Prednisone arm) with Grades 3 and ≥4 Intensity in the Previously Untreated Multiple Myeloma Study

MedDRA System Organ Class Preferred Term	VELCADE, Melphalan and Prednisone (N=340)			Melphalan and Prednisone (N=337)		
	Total n (%)	Toxicity Grade, n (%)		Total n (%)	Toxicity Grade, n (%)	
		3	≥4		3	≥4
Blood and Lymphatic System Disorders						
Thrombocytopenia	178 (52)	68 (20)	59 (17)	159 (47)	55 (16)	47 (14)
Neutropenia	165 (49)	102 (30)	35 (10)	155 (46)	79 (23)	49 (15)
Anemia	147 (43)	53 (16)	9 (3)	187 (55)	66 (20)	26 (8)
Leukopenia	113 (33)	67 (20)	10 (3)	100 (30)	55 (16)	13 (4)
Lymphopenia	83 (24)	49 (14)	18 (5)	58 (17)	30 (9)	7 (2)
Gastrointestinal Disorders						
Nausea	164 (48)	14 (4)	0	94 (28)	1 (<1)	0
Diarrhea	157 (46)	23 (7)	2 (1)	58 (17)	2 (1)	0
Constipation	125 (37)	2 (1)	0	54 (16)	0	0
Vomiting	112 (33)	14 (4)	0	55 (16)	2 (1)	0
Abdominal Pain	49 (14)	7 (2)	0	22 (7)	1 (<1)	0
Abdominal Pain Upper	40 (12)	1 (<1)	0	29 (9)	0	0
Dyspepsia	39 (11)	0	0	23 (7)	0	0
Nervous System Disorders						
Peripheral Neuropathy	159 (47)	43 (13)	2 (1)	18 (5)	0	0
Neuralgia	121 (36)	28 (8)	2 (1)	5 (1)	1 (<1)	0
Dizziness	56 (16)	7 (2)	0	37 (11)	1 (<1)	0
Headache	49 (14)	2 (1)	0	35 (10)	4 (1)	0
Paresthesia	45 (13)	6 (2)	0	15 (4)	0	0
General Disorders and Administration Site Conditions						
Pyrexia	99 (29)	8 (2)	2 (1)	64 (19)	6 (2)	2 (1)
Fatigue	98 (29)	23 (7)	2 (1)	86 (26)	7 (2)	0
Asthenia	73 (21)	20 (6)	1 (<1)	60 (18)	9 (3)	0
Edema Peripheral	68 (20)	2 (1)	0	34 (10)	0	0
Infections and Infestations						
Pneumonia	56 (16)	16 (5)	13 (4)	36 (11)	13 (4)	9 (3)
Herpes Zoster	45 (13)	11 (3)	0	14 (4)	6 (2)	0
Bronchitis	44 (13)	4 (1)	0	27 (8)	4 (1)	0
Nasopharyngitis	39 (11)	1 (<1)	0	27 (8)	0	0

Musculoskeletal and Connective

Tissue Disorders

Back Pain	58 (17)	9 (3)	1 (<1)	62 (18)	11 (3)	1 (<1)
Pain In Extremity	47 (14)	8 (2)	0	32 (9)	3 (1)	1 (<1)
Bone Pain	37 (11)	7 (2)	1 (<1)	35 (10)	7 (2)	0
Arthralgia	36 (11)	4 (1)	0	50 (15)	2 (1)	1 (<1)

Metabolism and Nutrition

Disorders

Anorexia	77 (23)	9 (3)	1 (<1)	34 (10)	4 (1)	0
Hypokalemia	44 (13)	19 (6)	3 (1)	25 (7)	8 (2)	2 (1)

Skin and Subcutaneous Tissue

Disorders

Rash	66 (19)	2 (1)	0	24 (7)	1 (<1)	0
Pruritus	35 (10)	3 (1)	0	18 (5)	0	0

**Respiratory, Thoracic and
Mediastinal Disorders**

Cough	71 (21)	0	0	45 (13)	2 (1)	0
Dyspnea	50 (15)	11 (3)	2 (1)	44 (13)	5 (1)	4 (1)

Psychiatric Disorders

Insomnia	69 (20)	1 (<1)	0	43 (13)	0	0
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Vascular Disorders

Hypertension	45 (13)	8 (2)	1 (<1)	25 (7)	2 (1)	0
Hypotension	41 (12)	4 (1)	3 (1)	10 (3)	2 (1)	2 (1)

350

351 **Relapsed Multiple Myeloma Randomized Study**

352 The safety data described below and in Table 7 reflect exposure to either VELCADE (n=331) or
 353 dexamethasone (n=332) in a study of patients with multiple myeloma. VELCADE was
 354 administered intravenously at doses of 1.3 mg/m² twice weekly for 2 out of 3 weeks (21 day
 355 cycle). After eight 21-day cycles patients continued therapy for three 35-day cycles on a weekly
 356 schedule. Duration of treatment was up to 11 cycles (9 months) with a median duration of 6
 357 cycles (4.1 months). For inclusion in the trial, patients must have had measurable disease and 1
 358 to 3 prior therapies. There was no upper age limit for entry. Creatinine clearance could be as low
 359 as 20 mL/min and bilirubin levels as high as 1.5 times the upper limit of normal. The overall
 360 frequency of adverse events was similar in men and women, and in patients <65 and ≥65 years of
 361 age. Most patients were Caucasian. [*see Clinical Studies (14.1)*]

362 Among the 331 VELCADE treated patients, the most commonly reported events overall were
 363 asthenic conditions (61%), diarrhea and nausea (each 57%), constipation (42%), peripheral
 364 neuropathy NEC (36%), vomiting, pyrexia, thrombocytopenia, and psychiatric disorders (each
 365 35%), anorexia and appetite decreased (34%), paresthesia and dysesthesia (27%), anemia and
 366 headache (each 26%), and cough (21%). The most commonly reported adverse events reported
 367 among the 332 patients in the dexamethasone group were psychiatric disorders (49%), asthenic
 368 conditions (45%), insomnia (27%), anemia (22%), and diarrhea and lower respiratory/lung
 369 infections (each 21%). Fourteen percent (14%) of patients in the VELCADE treated arm
 370 experienced a Grade 4 adverse event; the most common toxicities were thrombocytopenia (4%),

371 neutropenia (2%) and hypercalcemia (2%). Sixteen percent (16%) of dexamethasone treated
372 patients experienced a Grade 4 adverse event; the most common toxicity was hyperglycemia
373 (2%).

374 ***Serious Adverse Events (SAEs) and Events Leading to Treatment Discontinuation in the***
375 ***Relapsed Multiple Myeloma Study***

376 Serious adverse events are defined as any event, regardless of causality, that results in death, is
377 life-threatening, requires hospitalization or prolongs a current hospitalization, results in a
378 significant disability, or is deemed to be an important medical event. A total of 144 (44%)
379 patients from the VELCADE treatment arm experienced an SAE during the study, as did 144
380 (43%) dexamethasone-treated patients. The most commonly reported SAEs in the VELCADE
381 treatment arm were pyrexia (6%), diarrhea (5%), dyspnea and pneumonia (4%), and vomiting
382 (3%). In the dexamethasone treatment group, the most commonly reported SAEs were
383 pneumonia (7%), pyrexia (4%), and hyperglycemia (3%).

384 A total of 145 patients, including 84 (25%) of 331 patients in the VELCADE treatment group
385 and 61 (18%) of 332 patients in the dexamethasone treatment group were discontinued from
386 treatment due to adverse events assessed as drug-related by the investigators. Among the
387 331 VELCADE treated patients, the most commonly reported drug-related event leading to
388 discontinuation was peripheral neuropathy (8%). Among the 332 patients in the dexamethasone
389 group, the most commonly reported drug-related events leading to treatment discontinuation
390 were psychotic disorder and hyperglycemia (2% each).

391 Four deaths were considered to be VELCADE related in this relapsed multiple myeloma study: 1
392 case each of cardiogenic shock, respiratory insufficiency, congestive heart failure and cardiac
393 arrest. Four deaths were considered dexamethasone-related: 2 cases of sepsis, 1 case of
394 bacterial meningitis, and 1 case of sudden death at home.

395 ***Most Commonly Reported Adverse Events in the Relapsed Multiple Myeloma Study***

396 The most common adverse events from the relapsed multiple myeloma study are shown in
397 **Table 7**. All adverse events with incidence $\geq 10\%$ in the VELCADE arm are included.

398
399

Table 7: Most Commonly Reported Adverse Events (≥10% in VELCADE arm), with Grades 3 and 4 Intensity in the Relapsed Multiple Myeloma Study (N=663)

Adverse Event	Treatment Group					
	VELCADE (n=331) [n (%)]			Dexamethasone (n=332) [n (%)]		
	All Events	Grade 3 Events	Grade 4 Events	All Events	Grade 3 Events	Grade 4 Events
Adverse Event	331 (100)	203 (61)	45 (14)	327 (98)	146 (44)	52 (16)
Asthenic conditions	201 (61)	39 (12)	1 (<1)	148 (45)	20 (6)	0
Diarrhea	190 (57)	24 (7)	0	69 (21)	6 (2)	0
Nausea	190 (57)	8 (2)	0	46 (14)	0	0
Constipation	140 (42)	7 (2)	0	49 (15)	4 (1)	0
Peripheral neuropathy	120 (36)	24 (7)	2 (<1)	29 (9)	1 (<1)	1 (<1)
Vomiting	117 (35)	11 (3)	0	20 (6)	4 (1)	0
Pyrexia	116 (35)	6 (2)	0	54 (16)	4 (1)	1 (<1)
Thrombocytopenia	115 (35)	85 (26)	12 (4)	36 (11)	18 (5)	4 (1)
Psychiatric disorders	117 (35)	9 (3)	2 (<1)	163 (49)	26 (8)	3 (<1)
Anorexia and appetite decreased	112 (34)	9 (3)	0	31 (9)	1 (<1)	0
Paresthesia and dysesthesia	91 (27)	6 (2)	0	38 (11)	1 (<1)	0
Anemia	87 (26)	31 (9)	2 (<1)	74 (22)	32 (10)	3 (<1)
Headache	85 (26)	3 (<1)	0	43 (13)	2 (<1)	0
Cough	70 (21)	2 (<1)	0	35 (11)	1 (<1)	0
Dyspnea	65 (20)	16 (5)	1 (<1)	58 (17)	9 (3)	2 (<1)
Neutropenia	62 (19)	40 (12)	8 (2)	5 (2)	4 (1)	0
Rash	61 (18)	4 (1)	0	20 (6)	0	0
Insomnia	60 (18)	1 (<1)	0	90 (27)	5 (2)	0
Abdominal pain	53 (16)	6 (2)	0	12 (4)	1 (<1)	0
Bone pain	52 (16)	12 (4)	0	50 (15)	9 (3)	0
Lower respiratory/ lung infections	48 (15)	12 (4)	2 (<1)	69 (21)	24 (7)	1 (<1)
Pain in limb	50 (15)	5 (2)	0	24 (7)	2 (<1)	0
Back pain	46 (14)	10 (3)	0	33 (10)	4 (1)	0
Arthralgia	45 (14)	3 (<1)	0	35 (11)	5 (2)	0
Dizziness (excl. vertigo)	45 (14)	3 (<1)	0	34 (10)	0	0
Nasopharyngitis	45 (14)	1 (<1)	0	22 (7)	0	0
Herpes zoster	42 (13)	6 (2)	0	15 (5)	4 (1)	1 (<1)
Muscle cramps	41 (12)	0	0	50 (15)	3 (<1)	0
Myalgia	39 (12)	1 (<1)	0	18 (5)	1 (<1)	0
Rigors	37 (11)	0	0	8 (2)	0	0
Edema lower limb	35 (11)	0	0	43 (13)	1 (<1)	0

400

401

402 **Safety Experience from the Phase 2 Open-Label Extension Study in Relapsed Multiple**
403 **Myeloma**

404 In the phase 2 extension study of 63 patients, no new cumulative or new long-term toxicities
405 were observed with prolonged VELCADE treatment. These patients were treated for a total of
406 5.3 to 23 months, including time on VELCADE in the prior VELCADE study. [*see Clinical*
407 *Studies (14)*]

408 **Integrated Summary of Safety (Relapsed Multiple Myeloma and Mantle Cell Lymphoma)**

409 Safety data from phase 2 and 3 studies of single agent VELCADE 1.3 mg/m²/dose twice weekly
410 for 2 weeks followed by a 10-day rest period in 1163 patients with previously treated multiple
411 myeloma (N=1008) and previously treated mantle cell lymphoma (N=155) were integrated and
412 tabulated. In these studies, the safety profile of VELCADE was similar in patients with multiple
413 myeloma and mantle cell lymphoma. [*see Clinical Studies (14)*]

414 In the integrated analysis, the most commonly reported adverse events were asthenic conditions
415 (including fatigue, malaise, and weakness) (64%), nausea (55%), diarrhea (52%), constipation
416 (41%), peripheral neuropathy NEC (including peripheral sensory neuropathy and peripheral
417 neuropathy aggravated) (39%), thrombocytopenia and appetite decreased (including anorexia)
418 (each 36%), pyrexia (34%), vomiting (33%), and anemia (29%). Twenty percent (20%) of
419 patients experienced at least 1 episode of ≥Grade 4 toxicity, most commonly thrombocytopenia
420 (5%) and neutropenia (3%).

421 ***Serious Adverse Events (SAEs) and Events Leading to Treatment Discontinuation in the***
422 ***Integrated Summary of Safety***

423 A total of 50% of patients experienced SAEs during the studies. The most commonly reported
424 SAEs included pneumonia (7%), pyrexia (6%), diarrhea (5%), vomiting (4%), and nausea,
425 dehydration, dyspnea and thrombocytopenia (each 3%).

426 Adverse events thought by the investigator to be drug-related and leading to discontinuation
427 occurred in 22% of patients. The reasons for discontinuation included peripheral neuropathy
428 (8%), asthenic conditions (3%) and thrombocytopenia and diarrhea (each 2%).

429 In total, 2% of the patients died and the cause of death was considered by the investigator to be
430 possibly related to study drug: including reports of cardiac arrest, congestive heart failure,
431 respiratory failure, renal failure, pneumonia and sepsis.

432 ***Most Commonly Reported Adverse Events in the Integrated Summary of Safety***

433 The most common adverse events are shown in Table 8. All adverse events occurring at ≥10%
434 are included. In the absence of a randomized comparator arm, it is often not possible to
435 distinguish between adverse events that are drug-caused and those that reflect the patient's
436 underlying disease. Please see the discussion of specific adverse reactions that follows.

437
438
439

Table 8: Most Commonly Reported (≥10% Overall) Adverse Events in Integrated Analyses of Relapsed Multiple Myeloma and Mantle Cell Lymphoma Studies using the 1.3 mg/m² Dose (N=1163)

Adverse Events	All Patients (N=1163)		Multiple Myeloma (N=1008)		Mantle Cell Lymphoma (N=155)	
	All Events	≥Grade 3	All Events	≥Grade 3	All Events	≥Grade 3
Asthenic conditions	740 (64)	189 (16)	628 (62)	160 (16)	112 (72)	29 (19)
Nausea	640 (55)	43 (4)	572 (57)	39 (4)	68 (44)	4 (3)
Diarrhea	604 (52)	96 (8)	531 (53)	85 (8)	73 (47)	11 (7)
Constipation	481 (41)	26 (2)	404 (40)	22 (2)	77 (50)	4 (3)
Peripheral neuropathy	457 (39)	134 (12)	372 (37)	114 (11)	85 (55)	20 (13)
Thrombocytopenia	421 (36)	337 (29)	388 (38)	320 (32)	33 (21)	17 (11)
Appetite decreased	417 (36)	30 (3)	357 (35)	25 (2)	60 (39)	5 (3)
Pyrexia	401 (34)	36 (3)	371 (37)	34 (3)	30 (19)	2 (1)
Vomiting	385 (33)	57 (5)	343 (34)	53 (5)	42 (27)	4 (3)
Anemia	333 (29)	124 (11)	306 (30)	120 (12)	27 (17)	4 (3)
Edema	262 (23)	10 (<1)	218 (22)	6 (<1)	44 (28)	4 (3)
Paresthesia and dysesthesia	254 (22)	16 (1)	240 (24)	14 (1)	14 (9)	2 (1)
Headache	253 (22)	17 (1)	227 (23)	17 (2)	26 (17)	0
Dyspnea	244 (21)	59 (5)	209 (21)	52 (5)	35 (23)	7 (5)
Cough	232 (20)	5 (<1)	202 (20)	5 (<1)	30 (19)	0
Insomnia	232 (20)	7 (<1)	199 (20)	6 (<1)	33 (21)	1 (<1)
Rash	213 (18)	10 (<1)	170 (17)	6 (<1)	43 (28)	4 (3)
Arthralgia	199 (17)	27 (2)	179 (18)	25 (2)	20 (13)	2 (1)
Neutropenia	195 (17)	143 (12)	185 (18)	137 (14)	10 (6)	6 (4)
Dizziness (excluding vertigo)	195 (17)	18 (2)	159 (16)	13 (1)	36 (23)	5 (3)
Pain in limb	179 (15)	36 (3)	172 (17)	36 (4)	7 (5)	0
Abdominal pain	170 (15)	30 (3)	146 (14)	22 (2)	24 (15)	8 (5)
Bone pain	166 (14)	37 (3)	163 (16)	37 (4)	3 (2)	0
Back pain	151 (13)	39 (3)	150 (15)	39 (4)	1 (<1)	0
Hypotension	147 (13)	37 (3)	124 (12)	32 (3)	23 (15)	5 (3)
Herpes zoster	145 (12)	22 (2)	131 (13)	21 (2)	14 (9)	1 (<1)
Nasopharyngitis	139 (12)	2 (<1)	126 (13)	2 (<1)	13 (8)	0
Upper respiratory tract infection	138 (12)	2 (<1)	114 (11)	1 (<1)	24 (15)	1 (<1)
Myalgia	136 (12)	9 (<1)	121 (12)	9 (<1)	15 (10)	0
Pneumonia	134 (12)	72 (6)	120 (12)	65 (6)	14 (9)	7 (5)
Muscle cramps	125 (11)	1 (<1)	118 (12)	1 (<1)	7 (5)	0
Dehydration	120 (10)	40 (3)	109 (11)	33 (3)	11 (7)	7 (5)
Anxiety	118 (10)	6 (<1)	111 (11)	6 (<1)	7 (5)	0

440

441 **Description of Selected Adverse Events from the Phase 2 and 3 Relapsed Multiple Myeloma**
442 **and Phase 2 Mantle Cell Lymphoma Studies**

443 ***Gastrointestinal Events***

444 A total of 87% of patients experienced at least one GI disorder. The most common GI disorders
445 included nausea, diarrhea, constipation, vomiting, and appetite decreased. Other GI disorders
446 included dyspepsia and dysgeusia. Grade 3 GI events occurred in 18% of patients; Grade 4
447 events were 1%. GI events were considered serious in 11% of patients. Five percent (5%) of
448 patients discontinued due to a GI event. Nausea was reported more often in patients with
449 multiple myeloma (57%) compared to patients with mantle cell lymphoma (44%). [*see*
450 ***Warnings and Precautions (5.7)***]

451 ***Thrombocytopenia***

452 Across the studies, VELCADE associated thrombocytopenia was characterized by a decrease in
453 platelet count during the dosing period (days 1 to 11) and a return toward baseline during the 10-
454 day rest period during each treatment cycle. Overall, thrombocytopenia was reported in 36% of
455 patients. Thrombocytopenia was Grade 3 in 24%, \geq Grade 4 in 5%, and serious in 3% of
456 patients, and the event resulted in VELCADE discontinuation in 2% of patients [*see Warnings*
457 ***and Precautions (5.8)***]. Thrombocytopenia was reported more often in patients with multiple
458 myeloma (38%) compared to patients with mantle cell lymphoma (21%). The incidence of
459 \geq Grade 3 thrombocytopenia also was higher in patients with multiple myeloma (32%) compared
460 to patients with mantle cell lymphoma (11%). [*see Warnings and Precautions (5.8)*]

461 ***Peripheral Neuropathy***

462 Overall, peripheral neuropathy NEC occurred in 39% of patients. Peripheral neuropathy was
463 Grade 3 for 11% of patients and Grade 4 for <1% of patients. Eight percent (8%) of patients
464 discontinued VELCADE due to peripheral neuropathy. The incidence of peripheral neuropathy
465 was higher among patients with mantle cell lymphoma (55%) compared to patients with multiple
466 myeloma (37%).

467 In the relapsed multiple myeloma study, among the 87 patients who experienced \geq Grade 2
468 peripheral neuropathy, 51% had improved or resolved with a median of 3.5 months from first
469 onset.

470 Among the patients with peripheral neuropathy in the phase 2 multiple myeloma studies that was
471 Grade 2 and led to discontinuation or was \geq Grade 3, 73% (24 of 33) reported improvement or
472 resolution following VELCADE dose adjustment, with a median time to improvement of one
473 Grade or more from the last dose of VELCADE of 33 days. [*see Warnings and Precautions*
474 ***(5.2)***]

475 ***Hypotension***

476 The incidence of hypotension (postural hypotension, orthostatic hypotension and hypotension
477 NOS) was 13% in patients treated with VELCADE. Hypotension was Grade 1 or 2 in the
478 majority of patients and Grade 3 in 3% and \geq Grade 4 in <1%. Three percent (3%) of patients
479 had hypotension reported as an SAE, and 1% discontinued due to hypotension. The incidence of
480 hypotension was similar in patients with multiple myeloma (12%) and those with mantle cell
481 lymphoma (15%). In addition, 2% of patients experienced hypotension and had a syncopal
482 event. Doses of antihypertensive medications may need to be adjusted in patients receiving
483 VELCADE. [*see Warnings and Precautions (5.3)*]

484 ***Neutropenia***

485 Neutrophil counts decreased during the VELCADE dosing period (days 1 to 11) and returned
486 toward baseline during the 10-day rest period during each treatment cycle. Overall, neutropenia
487 occurred in 17% of patients and was Grade 3 in 9% of patients and \geq Grade 4 in 3%.

488 Neutropenia was reported as a serious event in $<1\%$ of patients and $<1\%$ of patients discontinued
489 due to neutropenia. The incidence of neutropenia was higher in patients with multiple myeloma
490 (18%) compared to patients with mantle cell lymphoma (6%). The incidence of \geq Grade 3
491 neutropenia also was higher in patients with multiple myeloma (14%) compared to patients with
492 mantle cell lymphoma (4%). [*see Warnings and Precautions (5.8)*]

493 ***Asthenic conditions (Fatigue, Malaise, Weakness)***

494 Asthenic conditions were reported in 64% of patients. Asthenia was Grade 3 for 16% and
495 \geq Grade 4 in $<1\%$ of patients. Four percent (4%) of patients discontinued treatment due to
496 asthenia. Asthenic conditions were reported in 62% of patients with multiple myeloma and 72%
497 of patients with mantle cell lymphoma.

498 ***Pyrexia***

499 Pyrexia ($>38^{\circ}\text{C}$) was reported as an adverse event for 34% of patients. The event was Grade 3 in
500 3% and \geq Grade 4 in $<1\%$. Pyrexia was reported as a serious adverse event in 6% of patients and
501 led to VELCADE discontinuation in $<1\%$ of patients. The incidence of pyrexia was higher
502 among patients with multiple myeloma (37%) compared to patients with mantle cell lymphoma
503 (19%). The incidence of \geq Grade 3 pyrexia was 3% in patients with multiple myeloma and 1% in
504 patients with mantle cell lymphoma.

505 ***Herpes Virus Infection***

506 Physicians should consider using antiviral prophylaxis in subjects being treated with VELCADE.
507 In the randomized studies in previously untreated and relapsed multiple myeloma, herpes zoster
508 reactivation was more common in subjects treated with VELCADE (13%) than in the control
509 groups (4-5%). Herpes simplex was seen in 2-8% in subjects treated with VELCADE and 1-5%
510 in the control groups. In the previously untreated multiple myeloma study, herpes zoster virus
511 reactivation in the VELCADE, melphalan and prednisone arm was less common in subjects
512 receiving prophylactic antiviral therapy (3%) than in subjects who did not receive prophylactic
513 antiviral therapy (17%). In the postmarketing experience, rare cases of herpes
514 meningoencephalitis and ophthalmic herpes have been reported.

515 ***Additional Adverse Events from Clinical Studies***

516 The following clinically important SAEs that are not described above have been reported in
517 clinical trials in patients treated with VELCADE administered as monotherapy or in combination
518 with other chemotherapeutics. These studies were conducted in patients with hematological
519 malignancies and in solid tumors.

520 ***Blood and lymphatic system disorders:*** Disseminated intravascular coagulation, lymphopenia,
521 leukopenia

522 ***Cardiac disorders:*** Angina pectoris, atrial fibrillation aggravated, atrial flutter, bradycardia,
523 sinus arrest, cardiac amyloidosis, complete atrioventricular block, myocardial ischemia,
524 myocardial infarction, pericarditis, pericardial effusion, Torsades de pointes, ventricular
525 tachycardia

526

- 527 ***Ear and labyrinth disorders:*** Hearing impaired, vertigo
- 528 ***Eye disorders:*** Diplopia and blurred vision, conjunctival infection, irritation
- 529 ***Gastrointestinal disorders:*** Ascites, dysphagia, fecal impaction, gastroenteritis, gastritis
530 hemorrhagic, hematemesis, hemorrhagic duodenitis, ileus paralytic, large intestinal obstruction,
531 paralytic intestinal obstruction, peritonitis, small intestinal obstruction, large intestinal
532 perforation, stomatitis, melena, pancreatitis acute, oral mucosal petechiae, gastroesophageal
533 reflux
- 534 ***General disorders and administration site conditions:*** Injection site erythema, neuralgia,
535 injection site pain, irritation, phlebitis
- 536 ***Hepatobiliary disorders:*** Cholestasis, hepatic hemorrhage, hyperbilirubinemia, portal vein
537 thrombosis, hepatitis, liver failure
- 538 ***Immune system disorders:*** Anaphylactic reaction, drug hypersensitivity, immune complex
539 mediated hypersensitivity, angioedema, laryngeal edema
- 540 ***Infections and infestations:*** Aspergillosis, bacteremia, urinary tract infection, herpes viral
541 infection, listeriosis, septic shock, toxoplasmosis, oral candidiasis, sinusitis, catheter related
542 infection
- 543 ***Injury, poisoning and procedural complications:*** Catheter related complication, skeletal
544 fracture, subdural hematoma
- 545 ***Metabolism and nutrition disorders:*** Hypocalcemia, hyperuricemia, hypokalemia,
546 hyperkalemia, hyponatremia, hypernatremia
- 547 ***Nervous system disorders:*** Ataxia, coma, dysarthria, dysautonomia, encephalopathy, cranial
548 palsy, grand mal convulsion, hemorrhagic stroke, motor dysfunction, spinal cord compression,
549 paralysis, postherpetic neuralgia, transient ischemic attack
- 550 ***Psychiatric disorders:*** Agitation, confusion, mental status change, psychotic disorder, suicidal
551 ideation
- 552 ***Renal and urinary disorders:*** Calculus renal, bilateral hydronephrosis, bladder spasm,
553 hematuria, hemorrhagic cystitis, urinary incontinence, urinary retention, renal failure (acute and
554 chronic), glomerular nephritis proliferative
- 555 ***Respiratory, thoracic and mediastinal disorders:*** Acute respiratory distress syndrome,
556 aspiration pneumonia, atelectasis, chronic obstructive airways disease exacerbated, dysphagia,
557 dyspnea, dyspnea exertional, epistaxis, hemoptysis, hypoxia, lung infiltration, pleural effusion,
558 pneumonitis, respiratory distress, pulmonary hypertension
- 559 ***Skin and subcutaneous tissue disorders:*** Urticaria, face edema, rash (which may be pruritic),
560 leukocytoclastic vasculitis
- 561 ***Vascular disorders:*** Cerebrovascular accident, cerebral hemorrhage, deep venous thrombosis,
562 peripheral embolism, pulmonary embolism, pulmonary hypertension

563 **6.2 Postmarketing Experience**

564 The following adverse drug reactions have been identified from the worldwide post-marketing
565 experience with VELCADE. Because these reactions are reported voluntarily from a population
566 of uncertain size, it is not always possible to reliably estimate their frequency or establish a
567 causal relationship to drug exposure: atrioventricular block complete, cardiac tamponade,

568 ischemic colitis, encephalopathy, dysautonomia, deafness bilateral, disseminated intravascular
569 coagulation, hepatitis, acute pancreatitis, acute diffuse infiltrative pulmonary disease, reversible
570 posterior leukoencephalopathy syndrome, toxic epidermal necrolysis, acute febrile neutrophilic
571 dermatosis (Sweet's syndrome), herpes meningoencephalitis and ophthalmic herpes.

572 **7 DRUG INTERACTIONS**

573 **7.1 Ketoconazole:** Co-administration of ketoconazole, a potent CYP3A inhibitor, increased the
574 exposure of bortezomib. [see *Pharmacokinetics (12.3)*] Therefore, patients should be closely
575 monitored when given bortezomib in combination with potent CYP3A4 inhibitors (e.g.
576 ketoconazole, ritonavir). [see *Pharmacokinetics (12.3)*]

577 **7.2 Melphalan-Prednisone:** Co-administration of melphalan-prednisone increased the exposure
578 of bortezomib. However, this increase is unlikely to be clinically relevant. [see
579 *Pharmacokinetics (12.3)*]

580 **7.3 Omeprazole:** Co-administration of omeprazole, a potent inhibitor of CYP2C19, had no
581 effect on the exposure of bortezomib. [see *Pharmacokinetics (12.3)*]

582 **7.4 Cytochrome P450:** Patients who are concomitantly receiving VELCADE and drugs that are
583 inhibitors or inducers of cytochrome P450 3A4 should be closely monitored for either toxicities
584 or reduced efficacy. [see *Pharmacokinetics (12.3)*]

585 **8 USE IN SPECIFIC POPULATIONS**

586 **8.1 Pregnancy**

587 Pregnancy Category D [see *Warnings and Precautions (5.1)*]

588 Bortezomib was not teratogenic in nonclinical developmental toxicity studies in rats and rabbits
589 at the highest dose tested (0.075 mg/kg; 0.5 mg/m² in the rat and 0.05 mg/kg; 0.6 mg/m² in the
590 rabbit) when administered during organogenesis. These dosages are approximately half the
591 clinical dose of 1.3 mg/m² based on body surface area.

592 Pregnant rabbits given bortezomib during organogenesis at a dose of 0.05mg/kg (0.6 mg/m²)
593 experienced significant post-implantation loss and decreased number of live fetuses. Live
594 fetuses from these litters also showed significant decreases in fetal weight. The dose is
595 approximately 0.5 times the clinical dose of 1.3 mg/m² based on body surface area.

596 There are no adequate and well-controlled studies in pregnant women. If VELCADE is used
597 during pregnancy, or if the patient becomes pregnant while receiving this drug, the patient should
598 be apprised of the potential hazard to the fetus.

599 **8.3 Nursing Mothers**

600 It is not known whether bortezomib is excreted in human milk. Because many drugs are
601 excreted in human milk and because of the potential for serious adverse reactions in nursing
602 infants from VELCADE, a decision should be made whether to discontinue nursing or to
603 discontinue the drug, taking into account the importance of the drug to the mother.

604 **8.4 Pediatric Use**

605 The safety and effectiveness of VELCADE in children have not been established.

606 **8.5 Geriatric Use**

607 Of the 669 patients enrolled in the relapsed multiple myeloma study, 245 (37%) were 65 years of
608 age or older: 125 (38%) on the VELCADE arm and 120 (36%) on the dexamethasone arm.
609 Median time to progression and median duration of response for patients ≥ 65 were longer on
610 VELCADE compared to dexamethasone [5.5 mo versus 4.3 mo, and 8.0 mo versus 4.9 mo,
611 respectively]. On the VELCADE arm, 40% (n=46) of evaluable patients aged ≥ 65 experienced
612 response (CR+PR) versus 18% (n=21) on the dexamethasone arm. The incidence of Grade 3 and
613 4 events was 64%, 78% and 75% for VELCADE patients ≤ 50 , 51-64 and ≥ 65 years old,
614 respectively. [*see Adverse Reactions (6.1); Clinical Studies (14)*]

615 No overall differences in safety or effectiveness were observed between patients \geq age 65 and
616 younger patients receiving VELCADE; but greater sensitivity of some older individuals cannot
617 be ruled out.

618 **8.6 Patients with Renal Impairment**

619 The pharmacokinetics of VELCADE are not influenced by the degree of renal impairment.
620 Therefore, dosing adjustments of VELCADE are not necessary for patients with renal
621 insufficiency. Since dialysis may reduce VELCADE concentrations, the drug should be
622 administered after the dialysis procedure. For information concerning dosing of melphalan in
623 patients with renal impairment see manufacturer's prescribing information. [*see Clinical*
624 *Pharmacology (12.3)*]

625 **8.7 Patients with Hepatic Impairment**

626 The exposure of bortezomib is increased in patients with moderate and severe hepatic
627 impairment. Starting dose should be reduced in those patients. [*see Dosage and Administration*
628 *(2.5), Warnings and Precautions (5.11), and Pharmacokinetics (12.3)*]

629 **8.8 Patients with Diabetes**

630 During clinical trials, hypoglycemia and hyperglycemia were reported in diabetic patients
631 receiving oral hypoglycemics. Patients on oral antidiabetic agents receiving VELCADE
632 treatment may require close monitoring of their blood glucose levels and adjustment of the dose
633 of their antidiabetic medication.

634 **10 OVERDOSAGE**

635 There is no known specific antidote for VELCADE overdose [*see Warnings and Precautions*
636 *(5.3) and Dosage and Administration (2.5)*]. In humans, fatal outcomes following the
637 administration of more than twice the recommended therapeutic dose have been reported, which
638 were associated with the acute onset of symptomatic hypotension and thrombocytopenia. In the
639 event of an overdose, the patient's vital signs should be monitored and appropriate supportive
640 care given.

641 Studies in monkeys and dogs showed that IV bortezomib doses as low as 2 times the
642 recommended clinical dose on a mg/m^2 basis were associated with increases in heart rate,
643 decreases in contractility, hypotension, and death. In dog studies, a slight increase in the
644 corrected QT interval was observed at doses resulting in death. In monkeys, doses of $3.0 \text{ mg}/\text{m}^2$
645 and greater (approximately twice the recommended clinical dose) resulted in hypotension
646 starting at 1 hour post-administration, with progression to death in 12 to 14 hours following drug
647 administration.

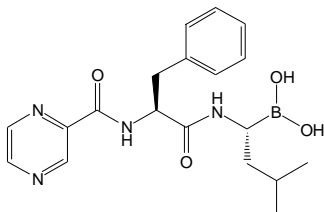
648 **11 DESCRIPTION**

649 VELCADE® (bortezomib) for Injection is an antineoplastic agent available for intravenous
650 injection (IV) use only. Each single use vial contains 3.5 mg of bortezomib as a sterile
651 lyophilized powder. Inactive ingredient: 35 mg mannitol, USP.

652 Bortezomib is a modified dipeptidyl boronic acid. The product is provided as a mannitol boronic
653 ester which, in reconstituted form, consists of the mannitol ester in equilibrium with its
654 hydrolysis product, the monomeric boronic acid. The drug substance exists in its cyclic
655 anhydride form as a trimeric boroxine.

656 The chemical name for bortezomib, the monomeric boronic acid, is [(1R)-3-methyl-1-[[[(2S)-1-
657 oxo-3-phenyl-2-[(pyrazinylcarbonyl) amino]propyl]amino]butyl] boronic acid.

658 Bortezomib has the following chemical structure:



659

660 The molecular weight is 384.24. The molecular formula is C₁₉H₂₅BN₄O₄. The solubility of
661 bortezomib, as the monomeric boronic acid, in water is 3.3 to 3.8 mg/mL in a pH range of 2 to
662 6.5.

663 **12 CLINICAL PHARMACOLOGY**

664 **12.1 Mechanism of Action**

665 Bortezomib is a reversible inhibitor of the chymotrypsin-like activity of the 26S proteasome in
666 mammalian cells. The 26S proteasome is a large protein complex that degrades ubiquitinated
667 proteins. The ubiquitin-proteasome pathway plays an essential role in regulating the intracellular
668 concentration of specific proteins, thereby maintaining homeostasis within cells. Inhibition of
669 the 26S proteasome prevents this targeted proteolysis, which can affect multiple signaling
670 cascades within the cell. This disruption of normal homeostatic mechanisms can lead to cell
671 death. Experiments have demonstrated that bortezomib is cytotoxic to a variety of cancer cell
672 types *in vitro*. Bortezomib causes a delay in tumor growth *in vivo* in nonclinical tumor models,
673 including multiple myeloma.

674 **12.2 Pharmacodynamics**

675 Following twice weekly administration of 1 mg/m² and 1.3 mg/m² bortezomib doses (n=12 per
676 each dose level), the maximum inhibition of 20S proteasome activity (relative to baseline) in
677 whole blood was observed 5 minutes after drug administration. Comparable maximum
678 inhibition of 20S proteasome activity was observed between 1 and 1.3 mg/m² doses. Maximal
679 inhibition ranged from 70% to 84% and from 73% to 83% for the 1 mg/m² and 1.3 mg/m² dose
680 regimens, respectively.

681 **12.3 Pharmacokinetics**

682 Following intravenous administration of 1 mg/m² and 1.3 mg/m² doses to 24 patients with
683 multiple myeloma (n=12, per each dose level), the mean maximum plasma concentrations of
684 bortezomib (C_{max}) after the first dose (Day 1) were 57 and 112 ng/mL, respectively. In

685 subsequent doses, when administered twice weekly, the mean maximum observed plasma
686 concentrations ranged from 67 to 106 ng/mL for the 1 mg/m² dose and 89 to 120 ng/mL for the
687 1.3 mg/m² dose. The mean elimination half-life of bortezomib upon multiple dosing ranged
688 from 40 to 193 hours after the 1 mg/m² dose and 76 to 108 hours after the 1.3mg/m² dose. The
689 mean total body clearances was 102 and 112 L/h following the first dose for doses of 1 mg/m²
690 and 1.3 mg/m², respectively, and ranged from 15 to 32 L/h following subsequent doses for doses
691 of 1 and 1.3 mg/m², respectively.

692 **Distribution:** The mean distribution volume of bortezomib ranged from approximately 498 to
693 1884 L/m² following single- or repeat-dose administration of 1 mg/m² or 1.3mg/m² to patients
694 with multiple myeloma. This suggests bortezomib distributes widely to peripheral tissues. The
695 binding of bortezomib to human plasma proteins averaged 83% over the concentration range of
696 100 to 1000 ng/mL.

697 **Metabolism:** *In vitro* studies with human liver microsomes and human cDNA-expressed
698 cytochrome P450 isozymes indicate that bortezomib is primarily oxidatively metabolized via
699 cytochrome P450 enzymes 3A4, 2C19, and 1A2. Bortezomib metabolism by CYP 2D6 and 2C9
700 enzymes is minor. The major metabolic pathway is deboronation to form 2 deboronated
701 metabolites that subsequently undergo hydroxylation to several metabolites. Deboronated
702 bortezomib metabolites are inactive as 26S proteasome inhibitors. Pooled plasma data from 8
703 patients at 10 min and 30 min after dosing indicate that the plasma levels of metabolites are low
704 compared to the parent drug.

705 **Elimination:** The pathways of elimination of bortezomib have not been characterized in humans.

706 **Age:** Analyses of data after the first dose of Cycle 1 (Day 1) in 39 multiple myeloma patients
707 who had received intravenous doses of 1 mg/m² and 1.3 mg/m² showed that both dose-
708 normalized AUC and C_{max} tend to be less in younger patients. Patients < 65 years of age (n=26)
709 had about 25% lower mean dose-normalized AUC and C_{max} than those ≥ 65 years of age (n=13).

710 **Gender:** Mean dose-normalized AUC and C_{max} values were comparable between male (n=22)
711 and female (n=17) patients after the first dose of Cycle 1 for the 1 and 1.3 mg/m² doses.

712 **Race:** The effect of race on exposure to bortezomib could not be assessed as most of the patients
713 were Caucasian.

714 **Hepatic Impairment:** The effect of hepatic impairment (see **Table 4** for definition of hepatic
715 impairment) on the pharmacokinetics of bortezomib was assessed in 51 cancer patients at
716 bortezomib doses ranging from 0.5 to 1.3 mg/m². When compared to patients with normal
717 hepatic function, mild hepatic impairment did not alter dose-normalized bortezomib AUC.
718 However, the dose-normalized mean AUC values were increased by approximately 60% in
719 patients with moderate or severe hepatic impairment. A lower starting dose is recommended in
720 patients with moderate or severe hepatic impairment, and those patients should be monitored
721 closely. [see **Dosage and Administration (2.5)**, **Warning and Precautions (5.11)** and **Use in**
722 **Specific Populations (8.7)**]

723 **Renal Impairment:** A pharmacokinetic study was conducted in patients with various degrees of
724 renal impairment who were classified according to their creatinine clearance values (CrCl) into
725 the following groups: Normal (CrCl ≥60 mL/min/1.73 m², N=12), Mild (CrCl=40-59
726 mL/min/1.73 m², N=10), Moderate (CrCl=20-39 mL/min/1.73 m², N=9), and Severe (CrCl < 20
727 mL/min/1.73 m², N=3). A group of dialysis patients who were dosed after dialysis was also
728 included in the study (N=8). Patients were administered intravenous doses of 0.7 to 1.3 mg/m²

729 of bortezomib twice weekly. Exposure of bortezomib (dose-normalized AUC and C_{max}) was
730 comparable among all the groups. [see *Use in Specific Populations (8.6)*]

731 **Pediatric:** There are no pharmacokinetic data in pediatric patients.

732 **Effect of Ketoconazole:** Co-administration of ketoconazole, a potent CYP3A inhibitor, showed a
733 35% increase in mean bortezomib AUC, based on data from 12 patients. [see *Drug Interactions*
734 *(7.1)*]

735 **Effect of Melphalan-Prednisone:** Co-administration of melphalan-prednisone on VELCADE
736 showed a 17% increase in mean bortezomib AUC based on data from 21 patients. This increase
737 is unlikely to be clinically relevant. [see *Drug Interactions (7.2)*]

738 **Effect of Omeprazole:** Co-administration of omeprazole, a potent inhibitor of CYP2C19, had no
739 significant effect on the pharmacokinetics of bortezomib, based on data from 17 patients. [see
740 *Drug Interactions (7.3)*]

741 **Cytochrome P450:** Bortezomib is a poor inhibitor of human liver microsome cytochrome P450
742 1A2, 2C9, 2D6, and 3A4, with IC_{50} values of $>30\mu M$ ($>11.5\mu g/mL$). Bortezomib may inhibit
743 2C19 activity ($IC_{50} = 18\mu M$, $6.9\mu g/mL$) and increase exposure to drugs that are substrates for
744 this enzyme. Bortezomib did not induce the activities of cytochrome P450 3A4 and 1A2 in
745 primary cultured human hepatocytes. [see *Drug Interactions (7.4)*]

746 **13 NONCLINICAL TOXICOLOGY**

747 **13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility**

748 Carcinogenicity studies have not been conducted with bortezomib.

749 Bortezomib showed clastogenic activity (structural chromosomal aberrations) in the in vitro
750 chromosomal aberration assay using Chinese hamster ovary cells. Bortezomib was not
751 genotoxic when tested in the in vitro mutagenicity assay (Ames test) and in vivo micronucleus
752 assay in mice.

753 Fertility studies with bortezomib were not performed but evaluation of reproductive tissues has
754 been performed in the general toxicity studies. In the 6-month rat toxicity study, degenerative
755 effects in the ovary were observed at doses $\geq 0.3\text{ mg/m}^2$ (one-fourth of the recommended clinical
756 dose), and degenerative changes in the testes occurred at 1.2 mg/m^2 . VELCADE could have a
757 potential effect on either male or female fertility.

758 **13.2 Animal Toxicology**

759 **Cardiovascular Toxicity:** Studies in monkeys showed that administration of dosages
760 approximately twice the recommended clinical dose resulted in heart rate elevations, followed by
761 profound progressive hypotension, bradycardia, and death 12 to 14 hours post dose. Doses
762 $\geq 1.2\text{ mg/m}^2$ induced dose-proportional changes in cardiac parameters. Bortezomib has been
763 shown to distribute to most tissues in the body, including the myocardium. In a repeated dosing
764 toxicity study in the monkey, myocardial hemorrhage, inflammation, and necrosis were also
765 observed.

766 **Chronic Administration:** In animal studies at a dose and schedule similar to that recommended
767 for patients (twice weekly dosing for 2 weeks followed by 1-week rest), toxicities observed
768 included severe anemia and thrombocytopenia, and gastrointestinal, neurological and lymphoid
769 system toxicities. Neurotoxic effects of bortezomib in animal studies included axonal swelling

770 and degeneration in peripheral nerves, dorsal spinal roots, and tracts of the spinal cord.
771 Additionally, multifocal hemorrhage and necrosis in the brain, eye, and heart were observed.

772 **14 CLINICAL STUDIES**

773 **14.1 Multiple Myeloma**

774 **Randomized, Open-Label Clinical Study in Patients with Previously Untreated Multiple** 775 **Myeloma:**

776 A prospective, international, randomized (1:1), open-label clinical study of 682 patients was
777 conducted to determine whether VELCADE (1.3 mg/m²) in combination with melphalan
778 (9 mg/m²) and prednisone (60 mg/m²) resulted in improvement in time to progression (TTP)
779 when compared to melphalan (9 mg/m²) and prednisone (60 mg/m²) in patients with previously
780 untreated multiple myeloma. Treatment was administered for a maximum of 9 cycles
781 (approximately 54 weeks) and was discontinued early for disease progression or unacceptable
782 toxicity. Antiviral prophylaxis was recommended for patients on the VELCADE study arm.

783 The median age of the patients in the study was 71 years (48;91), 50% were male, 88% were
784 Caucasian and the median Karnofsky performance status score for the patients was 80 (60;100).
785 Patients had IgG/IgA/Light chain myeloma in 63%/25%/8% instances, a median hemoglobin of
786 105 g/L (64;165), and a median platelet count of 221,500 /microliter (33,000;587,000).

787 Efficacy results for the trial are presented in Table 9. At a pre-specified interim analysis (with
788 median follow-up of 16.3 months), the combination of VELCADE, Melphalan and Prednisone
789 therapy resulted in significantly superior results for time to progression, progression free
790 survival, overall survival and response rate. Further enrollment was halted, and patients receiving
791 Melphalan and Prednisone were offered VELCADE in addition. A later, pre-specified analysis
792 of overall survival (with median follow-up of 36.7 months) continued to show a statistically
793 significant survival benefit for the VELCADE, Melphalan and Prednisone treatment arm despite
794 subsequent therapies including VELCADE based regimens.
795

796
797

Table 9: Summary of Efficacy Analyses in the Previously Untreated Multiple Myeloma Study

Efficacy Endpoint	VELCADE, Melphalan and Prednisone n=344	Melphalan and Prednisone n=338
Time to Progression		
Events n (%)	101 (29)	152 (45)
Median ^a (months)	20.7	15.0
(95% CI)	(17.6, 24.7)	(14.1, 17.9)
Hazard ratio ^b	0.54	
(95% CI)	(0.42, 0.70)	
p-value ^c	0.000002	
Progression-free Survival		
Events n (%)	135 (39)	190 (56)
Median ^a (months)	18.3	14.0
(95% CI)	(16.6, 21.7)	(11.1, 15.0)
Hazard ratio ^b	0.61	
(95% CI)	(0.49, 0.76)	
p-value ^c	0.00001	
Response Rate		
CR ^d n (%)	102 (30)	12 (4)
PR ^d n (%)	136 (40)	103 (30)
nCR n (%)	5 (1)	0
CR + PR ^d n (%)	238 (69)	115 (34)
p-value ^e	<10 ⁻¹⁰	
Overall Survival		
Events (deaths) n (%)	109 (32)	148 (44)
Median ^a (months)	Not Reached	43.1
(95% CI)	(46.2, NR)	(34.8, NR)
Hazard ratio ^b	0.65	
(95% CI)	(0.51, 0.84)	
p-value ^c	0.00084	

798 Note: All results are based on the analysis performed at a median follow-up duration of 16.3
799 months except for the overall survival analysis that was performed at a median follow-up
800 duration of 36.7 months.

801 ^a Kaplan-Meier estimate

802 ^b Hazard ratio estimate is based on a Cox proportional-hazard model adjusted for stratification
803 factors: beta2-microglobulin, albumin, and region. A hazard ratio less than 1 indicates an
804 advantage for VELCADE, Melphalan and Prednisone

805 ^c p-value based on the stratified log-rank test adjusted for stratification factors: beta2-
806 microglobulin, albumin, and region

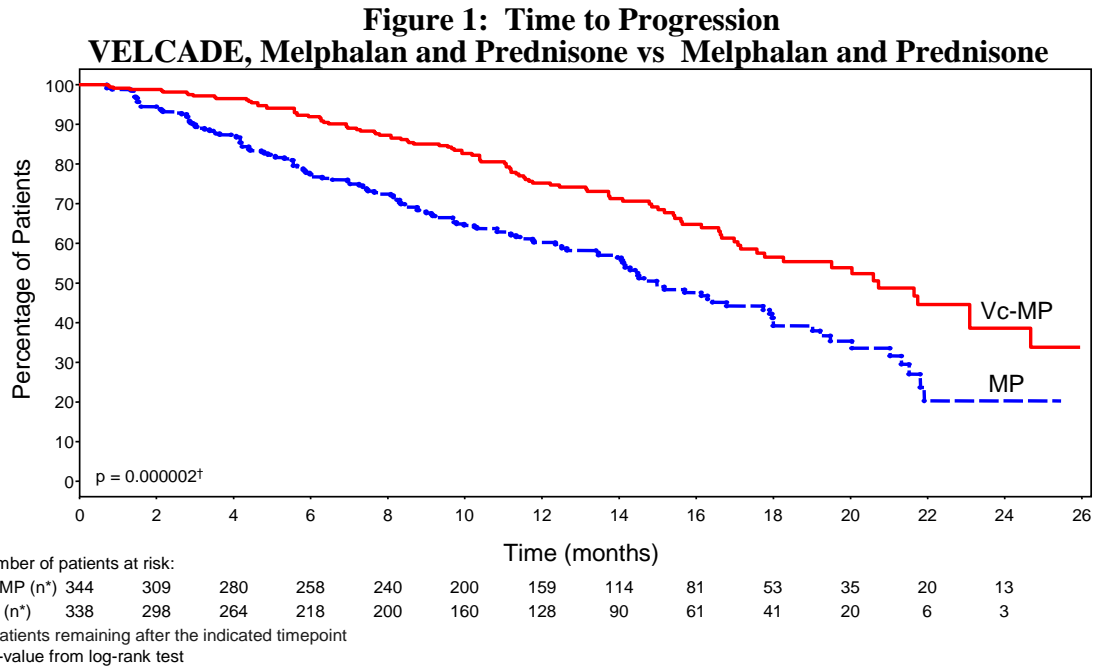
807 ^d EBMT criteria

808 ^e p-value for Response Rate (CR + PR) from the Cochran-Mantel-Haenszel chi-square test
809 adjusted for the stratification factors

810

811 TTP was statistically significantly longer on the VELCADE, Melphalan and Prednisone arm (see
 812 **Figure 1**). (median follow up 16.3 months)

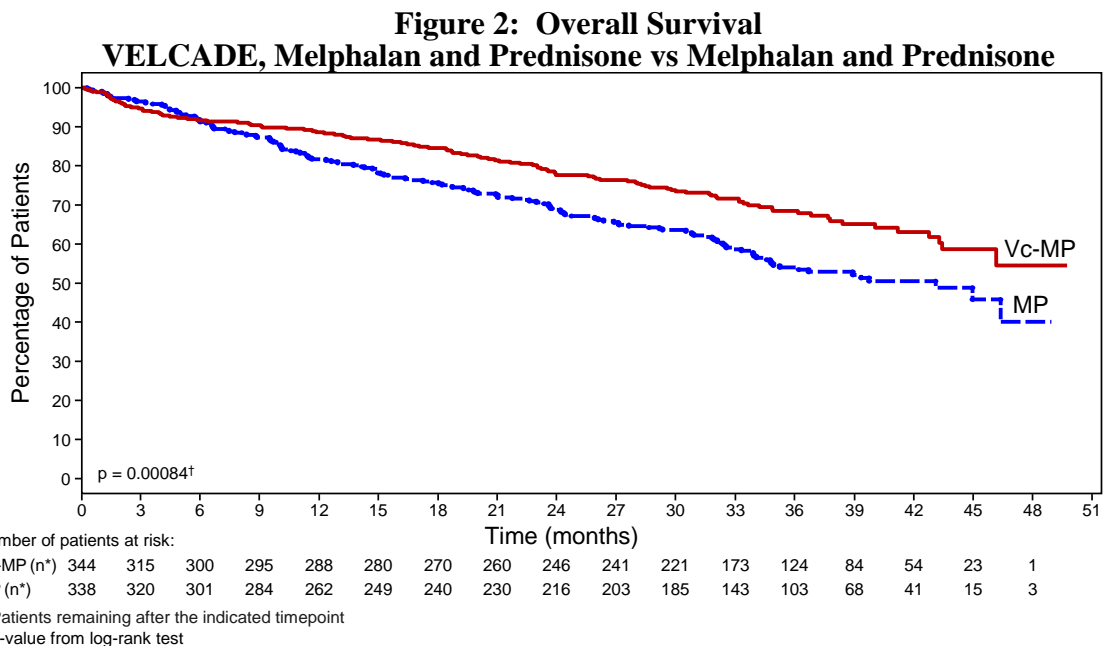
813
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815
 816

817 Overall survival was statistically significantly longer on the VELCADE, Melphalan and
 818 Prednisone arm (see Figure 2). (median follow up 36.7 months)

819
 820



821
 822

823 ***Randomized, Clinical Study in Relapsed Multiple Myeloma***

824 A prospective phase 3, international, randomized (1:1), stratified, open-label clinical study
 825 enrolling 669 patients was designed to determine whether VELCADE resulted in improvement

826 in time to progression (TTP) compared to high-dose dexamethasone in patients with progressive
827 multiple myeloma following 1 to 3 prior therapies. Patients considered to be refractory to prior
828 high-dose dexamethasone were excluded as were those with baseline grade ≥ 2 peripheral
829 neuropathy or platelet counts $< 50,000/\mu\text{L}$. A total of 627 patients were evaluable for response.

830 Stratification factors were based on the number of lines of prior therapy the patient had
831 previously received (1 previous line versus more than 1 line of therapy), time of progression
832 relative to prior treatment (progression during or within 6 months of stopping their most recent
833 therapy versus relapse > 6 months after receiving their most recent therapy), and screening
834 β_2 -microglobulin levels (≤ 2.5 mg/L versus > 2.5 mg/L).

835 Baseline patient and disease characteristics are summarized in **Table 10**.

836 **Table 10: Summary of Baseline Patient and Disease Characteristics**
837 **in the Relapsed Multiple Myeloma Study**

Patient Characteristics	VELCADE N=333	Dexamethasone N=336
Median age in years (range)	62.0 (33, 84)	61.0 (27, 86)
Gender: Male/female	56% / 44%	60% / 40%
Race: Caucasian/black/other	90% / 6% / 4%	88% / 7% / 5%
Karnofsky performance status score ≤ 70	13%	17%
Hemoglobin < 100 g/L	32%	28%
Platelet count $< 75 \times 10^9/\text{L}$	6%	4%
Disease Characteristics		
Type of myeloma (%): IgG/IgA/Light chain	60% / 23% / 12%	59% / 24% / 13%
Median β_2 -microglobulin (mg/L)	3.7	3.6
Median albumin (g/L)	39.0	39.0
Creatinine clearance ≤ 30 mL/min [n (%)]	17 (5%)	11 (3%)
Median Duration of Multiple Myeloma Since Diagnosis (Years)	3.5	3.1
Number of Prior Therapeutic Lines of Treatment		
Median	2	2
1 prior line	40%	35%
> 1 prior line	60%	65%
Previous Therapy		
Any prior steroids, e.g., dexamethasone, VAD	98%	99%
Any prior anthracyclines, e.g., VAD, mitoxantrone	77%	76%
Any prior alkylating agents, e.g., MP, VBMCP	91%	92%
Any prior thalidomide therapy	48%	50%
Vinca alkaloids	74%	72%
Prior stem cell transplant/other high-dose therapy	67%	68%
Prior experimental or other types of therapy	3%	2%

838 Patients in the VELCADE treatment group were to receive eight 3-week treatment cycles
839 followed by three 5-week treatment cycles of VELCADE. Patients achieving a CR were treated
840 for 4 cycles beyond first evidence of CR. Within each 3-week treatment cycle, VELCADE
841 $1.3 \text{ mg/m}^2/\text{dose}$ alone was administered by IV bolus twice weekly for 2 weeks on Days 1, 4, 8,
842 and 11 followed by a 10-day rest period (Days 12 to 21). Within each 5-week treatment cycle,

843 VELCADE 1.3 mg/m²/dose alone was administered by IV bolus once weekly for 4 weeks on
844 Days 1, 8, 15, and 22 followed by a 13-day rest period (Days 23 to 35). [*see Dosage and*
845 *Administration(2.1)*]

846 Patients in the dexamethasone treatment group were to receive four 5-week treatment cycles
847 followed by five 4-week treatment cycles. Within each 5-week treatment cycle, dexamethasone
848 40 mg/day PO was administered once daily on Days 1 to 4, 9 to 12, and 17 to 20 followed by a
849 15-day rest period (Days 21-35). Within each 4-week treatment cycle, dexamethasone
850 40 mg/day PO was administered once daily on Days 1 to 4 followed by a 24-day rest period
851 (Days 5 to 28). Patients with documented progressive disease on dexamethasone were offered
852 VELCADE at a standard dose and schedule on a companion study. Following a preplanned
853 interim analysis of time to progression, the dexamethasone arm was halted and all patients
854 randomized to dexamethasone were offered VELCADE, regardless of disease status.

855 In the VELCADE arm, 34% of patients received at least one VELCADE dose in all 8 of the
856 3-week cycles of therapy, and 13% received at least one dose in all 11 cycles. The average
857 number of VELCADE doses during the study was 22, with a range of 1 to 44. In the
858 dexamethasone arm, 40% of patients received at least one dose in all 4 of the 5-week treatment
859 cycles of therapy, and 6% received at least one dose in all 9 cycles.

860 The time to event analyses and response rates from the relapsed multiple myeloma study are
861 presented in **Table 11**. Response and progression were assessed using the European Group for
862 Blood and Marrow Transplantation (EBMT) criteria.¹ Complete response (CR) required <5%
863 plasma cells in the marrow, 100% reduction in M-protein, and a negative immunofixation test
864 (IF). Partial response (PR) requires ≥50% reduction in serum myeloma protein and ≥90%
865 reduction of urine myeloma protein on at least 2 occasions for a minimum of at least 6 weeks
866 along with stable bone disease and normal calcium. Near complete response (nCR) was defined
867 as meeting all the criteria for complete response including 100% reduction in M-protein by
868 protein electrophoresis, however M-protein was still detectable by immunofixation (IF⁺).

869

Table 11: Summary of Efficacy Analyses in the Relapsed Multiple Myeloma Study

Efficacy Endpoint	All Patients		1 Prior Line of Therapy		> 1 Prior Line of Therapy	
	VELCADE	Dex	VELCADE	Dex	VELCADE	Dex
	n=333	n=336	n=132	n=119	n=200	n=217
Time to Progression						
Events n (%)	147 (44)	196 (58)	55 (42)	64 (54)	92 (46)	132 (61)
Median ^a (95% CI)	6.2 mo (4.9, 6.9)	3.5 mo (2.9, 4.2)	7.0 mo (6.2, 8.8)	5.6 mo (3.4, 6.3)	4.9 mo (4.2, 6.3)	2.9 mo (2.8, 3.5)
Hazard ratio ^b (95% CI)	0.55 (0.44, 0.69)		0.55 (0.38, 0.81)		0.54 (0.41, 0.72)	
p-value ^c	<0.0001		0.0019		<0.0001	
Overall Survival						
Events (deaths) n (%)	51 (15)	84 (25)	12 (9)	24 (20)	39 (20)	60 (28)
Hazard ratio ^b (95% CI)	0.57 (0.40, 0.81)		0.39 (0.19, 0.81)		0.65 (0.43, 0.97)	
p-value ^{c,d}	<0.05		<0.05		<0.05	
Response Rate						
Population ^e n = 627	n=315	n=312	n=128	n=110	n=187	n=202
CR ^f n (%)	20 (6)	2 (<1)	8 (6)	2 (2)	12 (6)	0 (0)
PR ^f n(%)	101 (32)	54 (17)	49 (38)	27 (25)	52 (28)	27 (13)
nCR ^{f,g} n(%)	21 (7)	3 (<1)	8 (6)	2 (2)	13 (7)	1 (<1)
CR + PR ^f n (%)	121 (38)	56 (18)	57 (45)	29 (26)	64 (34)	27 (13)
p-value ^h	<0.0001		0.0035		<0.0001	

870 ^a Kaplan-Meier estimate

871 ^b Hazard ratio is based on Cox proportional-hazard model with the treatment as single
872 independent variable. A hazard ratio less than 1 indicates an advantage for VELCADE

873 ^c p-value based on the stratified log-rank test including randomization stratification factors

874 ^d Precise p-value cannot be rendered

875 ^e Response population includes patients who had measurable disease at baseline and received at
876 least 1 dose of study drug

877 ^f EBMT criteria¹; nCR meets all EBMT criteria for CR but has positive IF. Under EBMT
878 criteria nCR is in the PR category

879 ^g In 2 patients, the IF was unknown

880 ^h p-value for Response Rate (CR + PR) from the Cochran-Mantel-Haenszel chi-square test
881 adjusted for the stratification factors

882

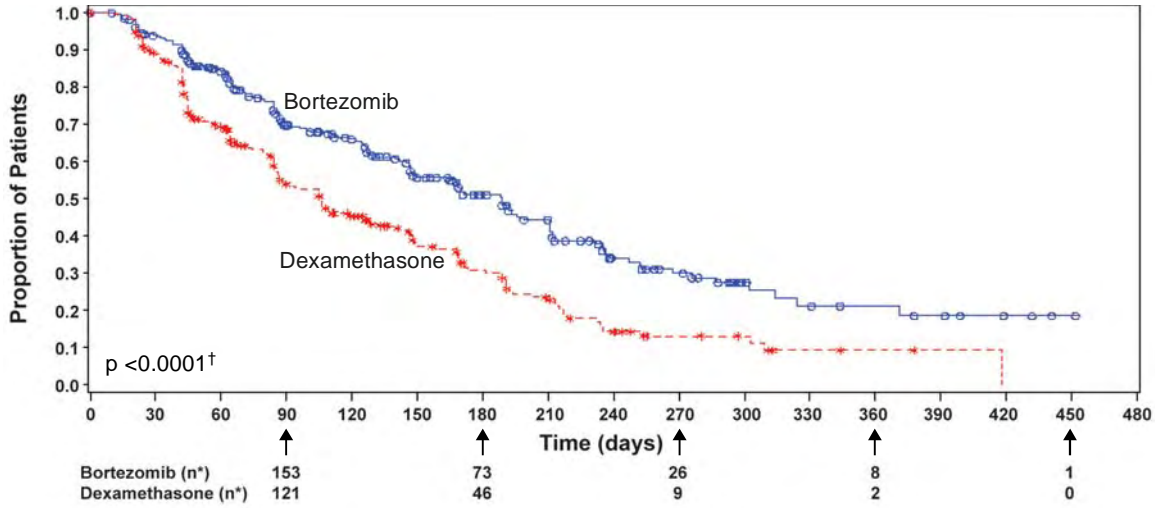
883 TTP was statistically significantly longer on the VELCADE arm (see Figure 3).

884

**Figure 3: Time to Progression
 Bortezomib vs. Dexamethasone (relapsed multiple myeloma study)**

885

886



* Patients remaining after the indicated timepoint

† p-value from log-rank test

887

888 As shown in **Figure 4** VELCADE had a significant survival advantage relative to
 889 dexamethasone ($p < 0.05$). The median follow-up was 8.3 months.

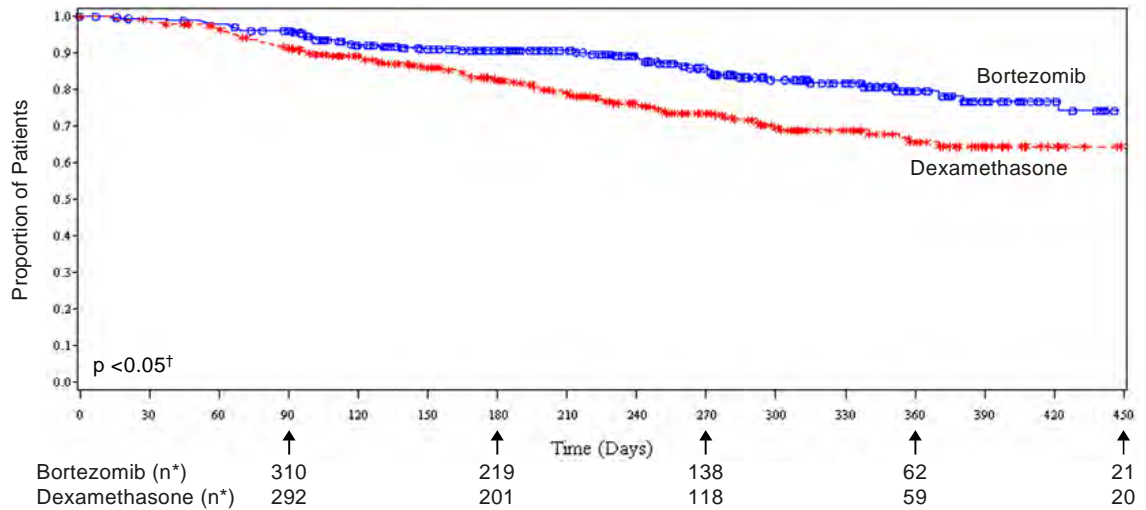
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**Figure 4: Overall Survival
 Bortezomib vs. Dexamethasone (relapsed multiple myeloma study)**

891

892

893



* Patients remaining after the indicated timepoint

† p-value from log-rank test

894

895 For the 121 patients achieving a response (CR or PR) on the VELCADE arm, the median
896 duration was 8.0 months (95% CI: 6.9, 11.5 months) compared to 5.6 months (95% CI: 4.8, 9.2
897 months) for the 56 responders on the dexamethasone arm. The response rate was significantly
898 higher on the VELCADE arm regardless of β_2 -microglobulin levels at baseline.

899 ***A Randomized Phase 2 Dose-Response Study in Relapsed Multiple Myeloma***

900 An open-label, multicenter study randomized 54 patients with multiple myeloma who had
901 progressed or relapsed on or after front-line therapy to receive VELCADE 1 mg/m² or 1.3 mg/m²
902 IV bolus twice weekly for 2 weeks on Days 1, 4, 8, and 11 followed by a 10-day rest period
903 (Days 12 to 21). The median duration of time between diagnosis of multiple myeloma and first
904 dose of VELCADE on this trial was 2.0 years, and patients had received a median of 1 prior line
905 of treatment (median of 3 prior therapies). A single complete response was seen at each dose.
906 The overall response rates (CR + PR) were 30% (8/27) at 1 mg/m² and 38% (10/26) at 1.3
907 mg/m².

908 ***A Phase 2 Open-Label Extension Study in Relapsed Multiple Myeloma***

909 Patients from the two phase 2 studies who in the investigators' opinion would experience
910 additional clinical benefit continued to receive VELCADE beyond 8 cycles on an extension
911 study. Sixty-three (63) patients from the phase 2 multiple myeloma studies were enrolled and
912 received a median of 7 additional cycles of VELCADE therapy for a total median of 14 cycles
913 (range 7 to 32). The overall median dosing intensity was the same in both the parent protocol
914 and extension study. Sixty-seven percent (67%) of patients initiated the extension study at the
915 same or higher dose intensity at which they completed the parent protocol, and 89% of patients
916 maintained the standard 3-week dosing schedule during the extension study. No new cumulative
917 or new long-term toxicities were observed with prolonged VELCADE treatment. [*see Adverse*
918 *Reactions(6.1)*]

919 **14.2 Mantle Cell Lymphoma**

920 ***A Phase 2 Single-arm Clinical Study in Relapsed Mantle Cell Lymphoma After Prior Therapy***

921 The safety and efficacy of VELCADE in relapsed or refractory mantle cell lymphoma were
922 evaluated in an open-label, single-arm, multicenter study of 155 patients with progressive disease
923 who had received at least 1 prior therapy. The median age of the patients was 65 years (42, 89),
924 81% were male, and 92% were Caucasian. Of the total, 75% had one or more extra-nodal sites of
925 disease, and 77% were stage 4. In 91% of the patients, prior therapy included all of the
926 following: an anthracycline or mitoxantrone, cyclophosphamide, and rituximab. A total of thirty
927 seven percent (37%) of patients were refractory to their last prior therapy. An IV bolus injection
928 of VELCADE 1.3 mg/m²/dose was administered twice weekly for 2 weeks on Days 1, 4, 8, and
929 11 followed by a 10-day rest period (Days 12 to 21) for a maximum of 17 treatment cycles.
930 Patients achieving a CR or CRu were treated for 4 cycles beyond first evidence of CR or CRu.
931 The study employed dose modifications for toxicity. [*see Dosage and Administration (2.4)*]

932 Responses to VELCADE are shown in Table 12. Response rates to VELCADE were determined
933 according to the International Workshop Response Criteria (IWRC)² based on independent
934 radiologic review of CT scans. The median number of cycles administered across all patients
935 was 4; in responding patients the median number of cycles was 8. The median time to response
936 was 40 days (range 31 to 204 days). The median duration of follow-up was more than 13
937 months.

938

Table 12: Response Outcomes in a Phase 2 Mantle Cell Lymphoma Study

Response Analyses (N = 155)	N (%)	95% CI
Overall Response Rate (IWRC) (CR + CRu + PR)	48 (31)	(24, 39)
Complete Response (CR + CRu)	12 (8)	(4, 13)
CR	10 (6)	(3, 12)
CRu	2 (1)	(0, 5)
Partial Response (PR)	36 (23)	(17, 31)
Duration of Response	Median	95% CI
CR + CRu + PR (N = 48)	9.3 months	(5.4, 13.8)
CR + CRu (N = 12)	15.4 months	(13.4, 15.4)
PR (N=36)	6.1 months	(4.2, 9.3)

939

940 **15 REFERENCES**

- 941 1. Bladé J, Samson D, Reece D, Apperley J, Bjorkstrand B, Gahrton G et al. Criteria for
942 evaluating disease response and progression in patients with multiple myeloma treated by high-
943 dose therapy and haematopoietic stem cell transplantation. Myeloma Subcommittee of the
944 EBMT. European Group for Blood and Marrow Transplant. *British Journal of Haematology*
945 1998;102(5):1115-1123.
- 946 2. Cheson BD, Horning SJ, Coiffier B, Shipp MA, Fisher RI, Connors JM et al. Report of an
947 international workshop to standardize response criteria for non-Hodgkin's lymphomas. NCI
948 Sponsored International Working Group. *Journal of Clinical Oncology* 1999; 17 (4):1244.
- 949 3. Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health
950 Care Settings. NIOSH Alert 2004-165.
- 951 4. OSHA Technical Manual, TED 1-0.15A, Section VI: Chapter 2. Controlling Occupational
952 Exposure to Hazardous Drugs. OSHA,
953 1999.http://www.osha.gov/dts/osta/otm/otm_vi/otm_vi_2.html.
- 954 5. American Society of Health-System Pharmacists. ASHP guidelines on handling hazardous
955 drugs. *Am J Health-Syst Pharm.* 2006;63:1172-1193.
- 956 6. Polovich, M., White, J. M., & Kelleher, L.O. (eds.) 2005. Chemotherapy and biotherapy
957 guidelines and recommendations for practice (2nd. ed.) Pittsburgh, PA: Oncology Nursing
958 Society.

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960 **16 HOW SUPPLIED/STORAGE AND HANDLING**

961 VELCADE[®] (bortezomib) for Injection is supplied as individually cartoned 10 mL vials
962 containing 3.5 mg of bortezomib as a white to off-white cake or powder.

963 NDC 63020-049-01

964 3.5 mg single use vial

965 Unopened vials may be stored at controlled room temperature 25°C (77°F); excursions permitted
966 from 15 to 30°C (59 to 86°F) [see USP Controlled Room Temperature]. Retain in original
967 package to protect from light.

968 Consider handling and disposal of VELCADE according to guidelines issued for cytotoxic
969 drugs, including the use of gloves and other protective clothing to prevent skin contact³⁻⁶.

970

971 **Caution: R_x only**

972 U.S. Patents: 5,780,454; 6,083,903; 6,297,217 B1; 6,617,317 B1; 6,713, 446 B2; 6,958,319 B2; 7,119,080 B2;
973 6,747,150 B2

974

975 ***Distributed and Marketed by:***
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977 40 Landsdowne Street
978 Cambridge, MA 02139

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984 Rev 11

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986 **17 PATIENT COUNSELING INFORMATION**

987 Physicians are advised to discuss the following with patients prior to treatment with VELCADE:

988 **Ability to Drive or Operate Machinery or Impairment of Mental Ability:** VELCADE may
989 cause fatigue, dizziness, syncope, orthostatic/postural hypotension. Patients should be advised
990 not to drive or operate machinery if they experience any of these symptoms.

991 **Dehydration/Hypotension:** Since patients receiving VELCADE therapy may experience
992 vomiting and/or diarrhea, patients should be advised regarding appropriate measures to avoid
993 dehydration. Patients should be instructed to seek medical advice if they experience symptoms
994 of dizziness, light headedness or fainting spells.

995 **Pregnancy/Nursing:** Patients should be advised to use effective contraceptive measures to
996 prevent pregnancy during treatment with VELCADE. If a patient becomes pregnant during
997 treatment she should be instructed to inform her physician immediately. Patients should also be
998 advised not to take VELCADE treatment while pregnant or breast-feeding. If a patient wishes to
999 restart breastfeeding after treatment, she should be advised to discuss the appropriate timing with
1000 her physician.

1001 **Concomitant Medications:** Patients should be advised to speak with their physician about any
1002 other medication they are currently taking.

1003 **Diabetic Patients:** Patients should be advised to check their blood sugar frequently if using an
1004 oral antidiabetic medication and notify their physician of any changes in blood sugar level.

1005 **Peripheral Neuropathy:** Patients should be advised to contact their physician if they experience
1006 new or worsening symptoms of peripheral neuropathy such as tingling, numbness, pain, a
1007 burning feeling in the feet or hands, or weakness in the arms or legs.

1008 **Other:** Patients should be instructed to contact their physician if they develop a rash, experience
1009 shortness of breath, cough, or swelling of the feet, ankles, or legs, convulsion, persistent
1010 headache, reduced eyesight, an increase in blood pressure or blurred vision.

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