

# DARATUMUMAB

Darzalex™

Concentrate for Solution for Infusion (IV)

Monoclonal Antibody

## FORMULATION

Daratumumab is an immunoglobulin G1 kappa (IgG1k) human monoclonal antibody against CD38 antigen, produced in a mammalian cell line (Chinese Hamster Ovary [CHO]) using recombinant DNA technology.

Daratumumab (Darzalex™) is available as a colorless to yellow preservative free liquid concentrate for intravenous infusion after dilution.

Each mL contains 20 mg daratumumab.

5 mL vial: Each single-use vial contains 100 mg daratumumab.

20 mL vial: Each single-use vial contains 400 mg daratumumab.

The excipients are glacial acetic acid, mannitol, polysorbate 20, sodium acetate trihydrate, sodium chloride and water for injection.

## PHARMACOLOGICAL PROPERTIES

### Pharmacodynamic Properties

#### Mechanism of Action

Daratumumab is an IgG1k human monoclonal antibody (mAb) that binds to the CD38 protein expressed at a high level on the surface of cells in a variety of hematological malignancies, including multiple myeloma tumor cells, as well as other cell types and tissues at various levels. CD38 protein has multiple functions such as receptor mediated adhesion, signaling and enzymatic activity.

Daratumumab has been shown to potently inhibit the *in vivo* growth of CD38-expressing tumor cells. Based on *in vitro* studies, daratumumab may utilize multiple effector functions, resulting in immune mediated tumor cell death. These studies suggest that daratumumab can induce tumor cell lysis through complement-dependent cytotoxicity (CDC), antibody-dependent cell-mediated cytotoxicity (ADCC), and antibody-dependent cellular phagocytosis (ADCP) in malignancies expressing CD38. A subset of myeloid derived suppressor cells (CD38+MDSCs), regulatory T cells (CD38+T<sub>regs</sub>) and B cells (CD38+B<sub>regs</sub>) are decreased by daratumumab. T cells (CD3+, CD4+, and CD8+) are also known to express CD38 depending on the stage of development and the level of activation. Significant increases in CD4+ and CD8+ T cell absolute counts, and percentages of lymphocytes, were observed with Daratumumab (Darzalex™) treatment in peripheral whole blood and bone marrow. T-cell receptor DNA sequencing verified that T-cell clonality was increased with Daratumumab (Darzalex™) treatment, indicating immune modulatory effects that may contribute to clinical response.

Daratumumab induced apoptosis *in vitro* after Fc mediated cross-linking. In addition, daratumumab modulated CD38 enzymatic activity, inhibiting the cyclase enzyme activity and stimulating the hydrolase activity. The significance of these *in vitro* effects in a clinical setting, and the implications on tumor growth, are not well-understood.

### Pharmacodynamic Effects

### **Natural killer (NK) cell and T-cell count**

NK cells are known to express high levels of CD38 and are susceptible to daratumumab mediated cell lysis. Decreases in absolute counts and percentages of total NK cells (CD16+CD56+) and activated (CD16+CD56<sup>dim</sup>) NK cells in peripheral whole blood and bone marrow were observed with Daratumumab (Darzalex™) treatment. However, baseline levels of NK cells did not show an association with clinical response.

### **Immunogenicity**

In multiple myeloma patients treated with Daratumumab (Darzalex™) in monotherapy and combination clinical trials, less than 1% of patients developed treatment-emergent anti-daratumumab antibodies.

Immunogenicity data are highly dependent on the sensitivity and specificity of the test methods used. Additionally, the observed incidence of a positive result in a test method may be influenced by several factors, including sample handling, timing of sample collection, drug interference, concomitant medication and the underlying disease. Therefore, comparison of the incidence of antibodies to daratumumab with the incidence of antibodies to other products may be misleading.

## **CLINICAL STUDIES**

### ***Newly Diagnosed Multiple Myeloma***

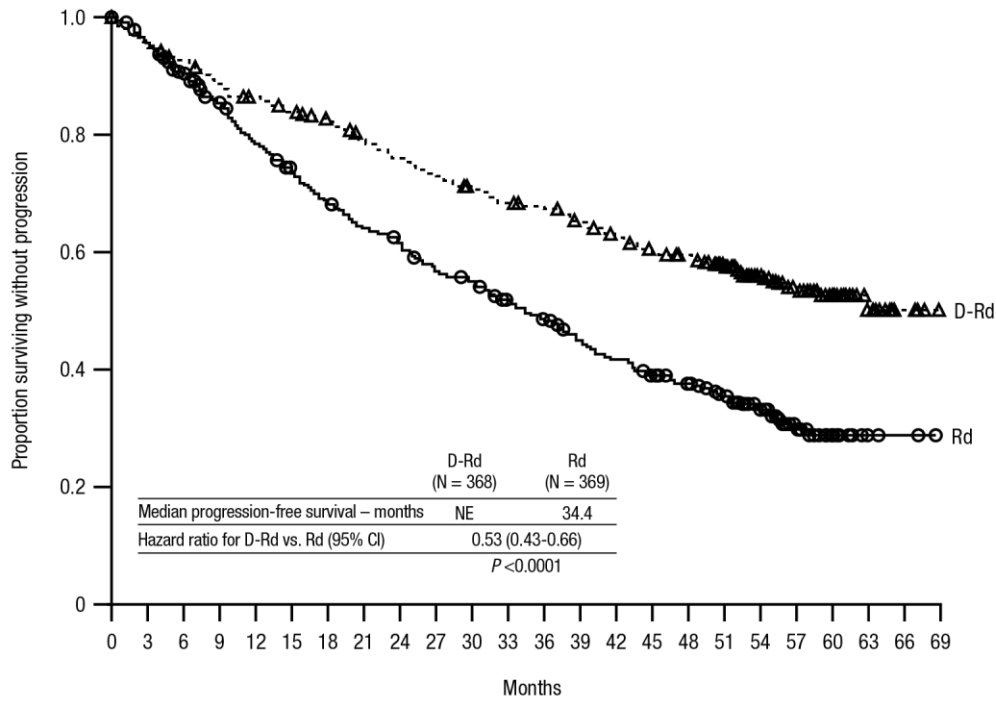
#### *Combination treatment with lenalidomide and dexamethasone in patients ineligible for autologous stem cell transplant*

Study MMY3008 an open-label, randomized, active-controlled Phase 3 study, compared treatment with Daratumumab (Darzalex™) 16 mg/kg in combination with lenalidomide and low-dose dexamethasone (DRd) to treatment with lenalidomide and low-dose dexamethasone (Rd) in patients with newly diagnosed multiple myeloma. Lenalidomide (25 mg once daily orally on Days 1-21 of repeated 28-day [4-week] cycles) was given with low dose oral or intravenous dexamethasone 40 mg/week (or a reduced dose of 20 mg/week for patients >75 years or body mass index [BMI] <18.5). On Daratumumab (Darzalex™) infusion days, the dexamethasone dose was given as a pre-infusion medication. Dose adjustments for lenalidomide and dexamethasone were applied according to manufacturer's prescribing information. Treatment was continued in both arms until disease progression or unacceptable toxicity.

A total of 737 patients were randomized: 368 to the DRd arm and 369 to the Rd arm. The baseline demographic and disease characteristics were similar between the two treatment groups. The median age was 73 (range: 45-90) years, with 44% of the patients ≥75 years of age. The majority were white (92%), male (52%), 34% had an Eastern Cooperative Oncology Group (ECOG) performance score of 0, 50% had an ECOG performance score of 1 and 17% had an ECOG performance score of ≥2. Twenty-seven percent had International Staging System (ISS) Stage I, 43% had ISS Stage II and 29% had ISS Stage III disease. Efficacy was evaluated by progression free survival (PFS) based on International Myeloma Working Group (IMWG) criteria and overall survival (OS).

With a median follow-up of 28 months, the primary analysis of PFS in study MMY3008 demonstrated an improvement in the DRd arm as compared to the Rd arm; the median PFS had not been reached in the DRd arm and was 31.9 months in the Rd arm (hazard ratio [HR]=0.56; 95% CI: 0.43, 0.73; p<0.0001), representing 44% reduction in the risk of disease progression or death in patients treated with DRd. Results of an updated PFS analysis after a median follow-up of 56 months continued to show an improvement in PFS for patients in the DRd arm compared with the Rd arm. Median PFS was not reached in the DRd arm and 34.4 months in the Rd arm (HR=0.53; 95% CI: 0.43, 0.66; p<0.001).

**Figure 1: Kaplan-Meier Curve of PFS in Study MMY3008**

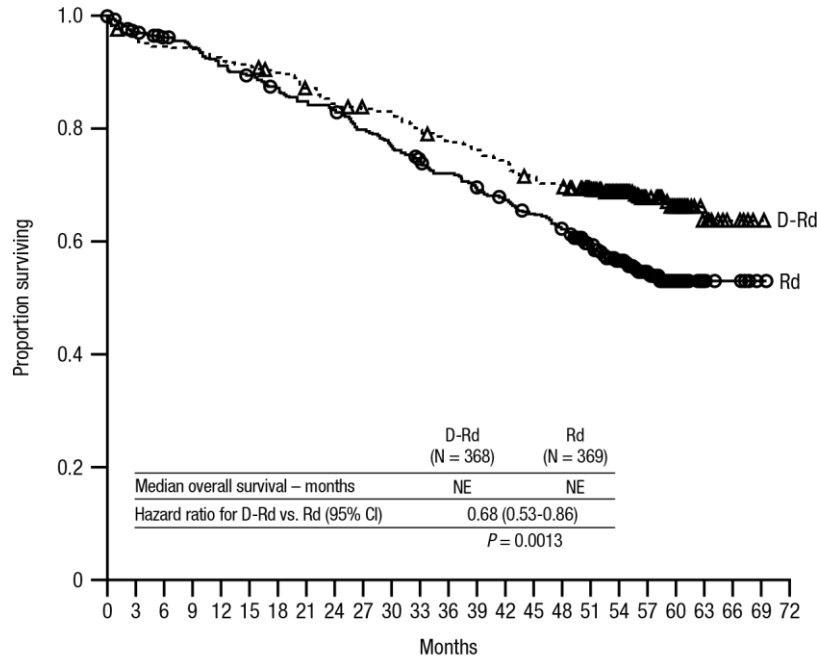


No. at risk

Rd	369	333	307	280	255	237	220	205	196	179	172	155	146	133	123	113	105	94	63	36	12	4	2	0
D-Rd	368	347	335	320	309	300	290	276	266	256	246	237	232	222	210	199	195	170	123	87	51	17	5	0

After a median follow-up of 56 months, DRd has shown an OS advantage over the Rd arm (HR=0.68; 95% CI: 0.53, 0.86;  $p=0.0013$ ), representing a 32% reduction in the risk of death in patients treated in the DRd arm. Median OS was not reached for either arm. The 60-month survival rate was 66% (95% CI: 61, 71) in the DRd arm and was 53% (95% CI: 47, 59) in the Rd arm.

**Figure 2: Kaplan-Meier Curve of OS in Study MMY3008**



No. at risk

	0	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72
Rd	369	351	343	336	324	317	308	300	294	281	270	258	251	241	232	223	213	183	134	85	42	14	5	1	0
D-Rd	368	350	346	344	338	334	328	316	305	302	297	286	280	273	266	255	249	228	170	118	63	22	6	1	0

Additional efficacy results from Study MMY3008 are presented in the table below.

**Table 1: Additional efficacy results from Study MMY3008<sup>a</sup>**

	<b>DRd (n=368)</b>	<b>Rd (n=369)</b>
Overall response (sCR+CR+VGPR+PR) n(%) <sup>a</sup>	342 (92.9%)	300 (81.3%)
p-value <sup>b</sup>	<0.0001	
Stringent complete response (sCR)	112 (30.4%)	46 (12.5%)
Complete response (CR)	63 (17.1%)	46 (12.5%)
Very good partial response (VGPR)	117 (31.8%)	104 (28.2%)
Partial response (PR)	50 (13.6%)	104 (28.2%)
CR or better (sCR + CR)	175 (47.6%)	92 (24.9%)
p-value <sup>b</sup>	<0.0001	
VGPR or better (sCR + CR + VGPR)	292 (79.3%)	196 (53.1%)
p-value <sup>b</sup>	<0.0001	
MRD negativity rate <sup>a, c</sup> n(%)	89 (24.2%)	27 (7.3%)
95% CI (%)	(19.9%, 28.9%)	(4.9%, 10.5%)
Odds ratio with 95% CI <sup>d</sup>	4.04 (2.55, 6.39)	
p-value <sup>e</sup>	<0.0001	

DRd=daratumumab-lenalidomide-dexamethasone; Rd=lenalidomide-dexamethasone; MRD=minimal residual disease; CI=confidence interval

<sup>a</sup> Based on intent-to-treat population

<sup>b</sup> p-value from Cochran Mantel-Haenszel Chi-Squared test.

<sup>c</sup> Based on threshold of 10<sup>-5</sup>

<sup>d</sup> Mantel-Haenszel estimate of the odds ratio for un-stratified tables is used. An odds ratio > 1 indicates an advantage for DRd.

<sup>e</sup> p-value from Fisher's exact test.

In responders, the median time to response was 1.05 months (range: 0.2 to 12.1 months) in the DRd group and 1.05 months (range: 0.3 to 15.3 months) in the Rd group. The median duration of response had not been reached in the DRd group and was 34.7 months (95% CI: 30.8, not estimable) in the Rd group.

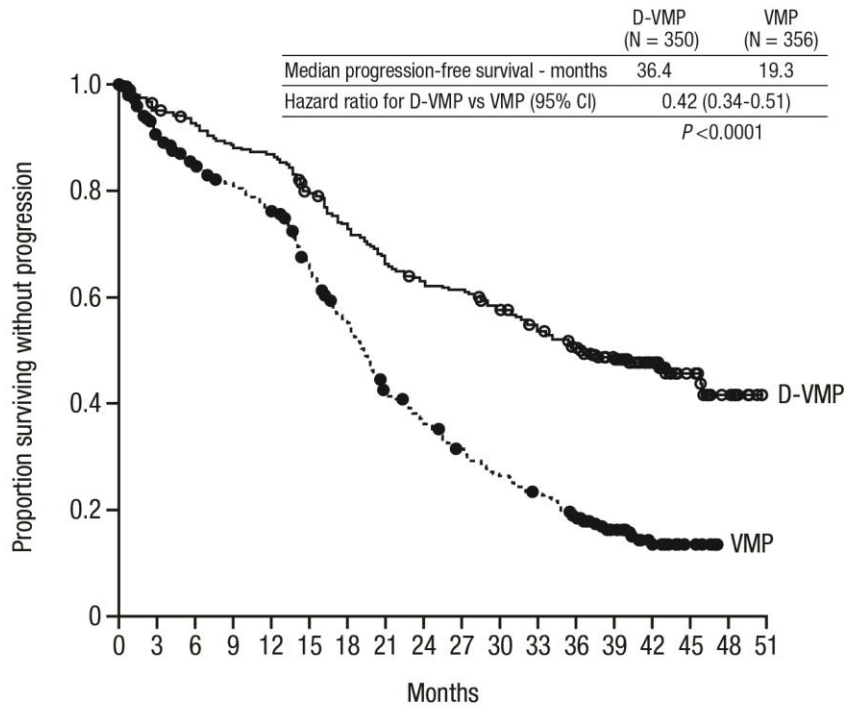
*Combination treatment with bortezomib, melphalan and prednisone (VMP) in patients ineligible for autologous stem cell transplant*

Study MMY3007, an open-label, randomized, active-controlled Phase 3 study, compared treatment with Daratumumab (Darzalex™) 16 mg/kg in combination with bortezomib, melphalan and prednisone (D-VMP), to treatment with VMP in patients with newly diagnosed multiple myeloma. Bortezomib was administered by subcutaneous (SC) injection at a dose of 1.3 mg/m<sup>2</sup> body surface area twice weekly at Weeks 1, 2, 4 and 5 for the first 6-week cycle (Cycle 1; 8 doses), followed by once weekly administrations at Weeks 1, 2, 4 and 5 for eight more 6-week cycles (Cycles 2-9; 4 doses per cycle). Melphalan at 9 mg/m<sup>2</sup>, and prednisone at 60 mg/m<sup>2</sup> were orally administered on Days 1 to 4 of the nine 6-week cycles (Cycles 1-9). Daratumumab (Darzalex™) treatment was continued until disease progression or unacceptable toxicity.

A total of 706 patients were randomized: 350 to the D-VMP arm and 356 to the VMP arm. The baseline demographic and disease characteristics were similar between the two treatment groups. The median age was 71 (range: 40-93) years, with 30% of the patients ≥75 years of age. The majority were white (85%), female (54%), 25% had an ECOG performance score of 0, 50% had an ECOG performance score of 1 and 25% had an ECOG performance score of 2. Patients had IgG/IgA/Light chain myeloma in 64%/22%/10% of instances, 19% had ISS Stage I, 42% had ISS Stage II and 38% had ISS Stage III disease. Efficacy was evaluated by PFS based on IMWG criteria and overall survival (OS).

With a median follow-up of 16.5 months, the primary analysis of PFS in study MMY3007 demonstrated an improvement in the D-VMP arm as compared to the VMP arm; the median PFS had not been reached in the D-VMP arm and was 18.1 months in the VMP arm (HR=0.5; 95% CI: 0.38, 0.65; p<0.0001), representing 50% reduction in the risk of disease progression or death in patients treated with D-VMP. Results of an updated PFS analysis after a median follow-up of 40 months continued to show an improvement in PFS for patients in the D-VMP arm compared with the VMP arm. Median PFS was 36.4 months in the D-VMP arm and 19.3 months in the VMP arm (HR=0.42; 95% CI: 0.34, 0.51; p<0.0001), representing a 58% reduction in the risk of disease progression or death in patients treated with D-VMP.

**Figure 3: Kaplan-Meier Curve of PFS in Study MMY3007**

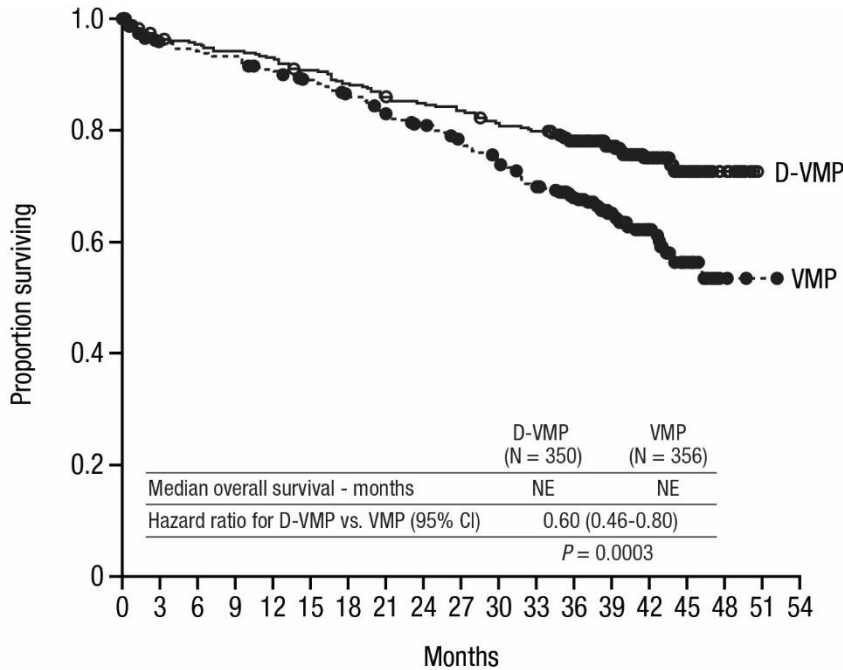


No. at risk

VMP	356	304	278	263	246	207	171	128	110	93	78	67	51	29	15	7	0	0
D-VMP	350	322	312	298	292	265	243	220	207	202	188	173	160	113	63	26	9	0

After a median follow-up of 40 months, D-VMP has shown an overall survival (OS) advantage over VMP arm (HR=0.60; 95% CI: 0.46, 0.80; p=0.0003), representing a 40% reduction in the risk of death in patients treated in the D-VMP arm. Median OS was not reached for either arm.

**Figure 4: Kaplan-Meier Curve of OS in Study MMY3007**



No. at risk	0	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54
VMP	356	331	325	322	312	302	292	278	269	257	242	226	198	132	73	27	3	1	0
D-VMP	350	330	327	322	318	309	301	292	288	283	275	270	248	171	97	40	12	0	0

Additional efficacy results from Study MMY3007 are presented in the table below.

**Table 2: Additional efficacy results from Study MMY3007<sup>a</sup>**

	D-VMP (n=350)	VMP (n=356)
Overall response (sCR+CR+VGPR+PR) [n(%)]	318 (90.9)	263 (73.9)
p-value <sup>b</sup>	<0.0001	
Stringent complete response (sCR) [n(%)]	63 (18.0)	25 (7.0)
Complete response (CR) [n(%)]	86 (24.6)	62 (17.4)
Very good partial response (VGPR) [n(%)]	100 (28.6)	90 (25.3)
Partial response (PR) [n(%)]	69 (19.7)	86 (24.2)
MRD negative rate (95% CI) <sup>c</sup> (%)	22.3 (18.0, 27.0)	6.2 (3.9, 9.2)
Odds ratio with 95% CI <sup>d</sup>	4.36 (2.64, 7.21)	
p-value <sup>e</sup>	<0.0001	

D-VMP = daratumumab-bortezomib-melphalan-prednisone; VMP = bortezomib-melphalan-prednisone; MRD = minimal residual disease; CI = confidence interval; NE = not estimable.

<sup>a</sup> Based on intent-to-treat population

<sup>b</sup> p-value from Cochran Mantel-Haenszel Chi-Squared test.

<sup>c</sup> Based on threshold of 10<sup>-5</sup>

<sup>d</sup> A Mantel-Haenszel estimate of the common odds ratio for stratified tables is used. An odds ratio > 1 indicates an advantage for D-VMP.

<sup>e</sup> P-value from Fisher’s exact test.

In responders, the median time to response was 0.79 months (range: 0.4 to 15.5 months) in the D-VMP group and 0.82 months (range: 0.7 to 12.6 months) in the VMP group. The median duration of response

had not been reached in the D-VMP group and was 21.3 months (range: 18.4, not estimable) in the VMP group.

*Combination with bortezomib, thalidomide and dexamethasone in patients eligible for autologous stem cell transplant (ASCT)*

Study MMY3006, an open-label, randomized, active-controlled Phase 3 study compared induction and consolidation treatment with Daratumumab (Darzalex™) 16 mg/kg in combination with bortezomib, thalidomide and dexamethasone (DVTd) to treatment with bortezomib, thalidomide and dexamethasone (VTd) in patients with newly diagnosed multiple myeloma eligible for ASCT. The consolidation phase of treatment began a minimum of 30 days post-ASCT, when the patient had recovered sufficiently, and engraftment was complete.

Bortezomib was administered by subcutaneous (SC) injection or intravenous (IV) injection at a dose of 1.3 mg/m<sup>2</sup> body surface area twice weekly for two weeks (Days 1, 4, 8, and 11) of repeated 28-day (4-week) induction treatment cycles (Cycles 1-4) and two consolidation cycles (Cycles 5 and 6) following ASCT after Cycle 4. Thalidomide was administered orally at 100 mg daily during the six bortezomib cycles. Dexamethasone (oral or intravenous) was administered at 40 mg on Days 1, 2, 8, 9, 15, 16, 22 and 23 of Cycles 1 and 2, and at 40 mg on Days 1-2 and 20 mg on subsequent dosing days (Days 8, 9, 15, 16) of Cycles 3-4. Dexamethasone 20 mg was administered on Days 1, 2, 8, 9, 15, 16 in Cycles 5 and 6. On the days of Daratumumab (Darzalex™) infusion, the dexamethasone dose was administered intravenously as a pre-infusion medication. Dose adjustments for bortezomib, thalidomide and dexamethasone were applied according to manufacturer’s prescribing information.

A total of 1085 patients were randomized: 543 to the DVTd arm and 542 to the VTd arm. The baseline demographic and disease characteristics were similar between the two treatment groups. The median age was 58 (range: 22 to 65 years). The majority were male (59%), 48% had an ECOG performance score of 0, 42% had an ECOG performance score of 1 and 10% had an ECOG performance score of 2. Forty percent had ISS Stage I, 45% had ISS Stage II and 15% had ISS Stage III disease.

Efficacy was evaluated by the stringent Complete Response (sCR) rate at Day 100 post-transplant.

**Table 3: Efficacy results from Study MMY3006<sup>a</sup>**

	DVTd (n=543)	VTd (n=542)	P value <sup>b</sup>
Response assessment Day 100 post-transplant			
Stringent Complete Response (sCR)	157 (28.9%)	110 (20.3%)	0.0010
CR or better (sCR+CR)	211 (38.9%)	141 (26.0%)	<0.0001
Very Good Partial Response or better (sCR+CR+VGPR)	453 (83.4%)	423 (78.0%)	
MRD negativity <sup>c</sup> n(%)	346 (63.7%)	236 (43.5%)	<0.0001
95% CI (%)	(59.5%, 67.8%)	(39.3%, 47.8%)	
Odds ratio with 95% CI <sup>d</sup>	2.27 (1.78, 2.90)		
MRD negativity <sup>e</sup> n(%)	183 (33.7%)	108 (19.9%)	<0.0001
95% CI (%)	(29.7%, 37.9%)	(16.6%, 23.5%)	
Odds ratio with 95% CI <sup>d</sup>	2.06 (1.56, 2.72)		

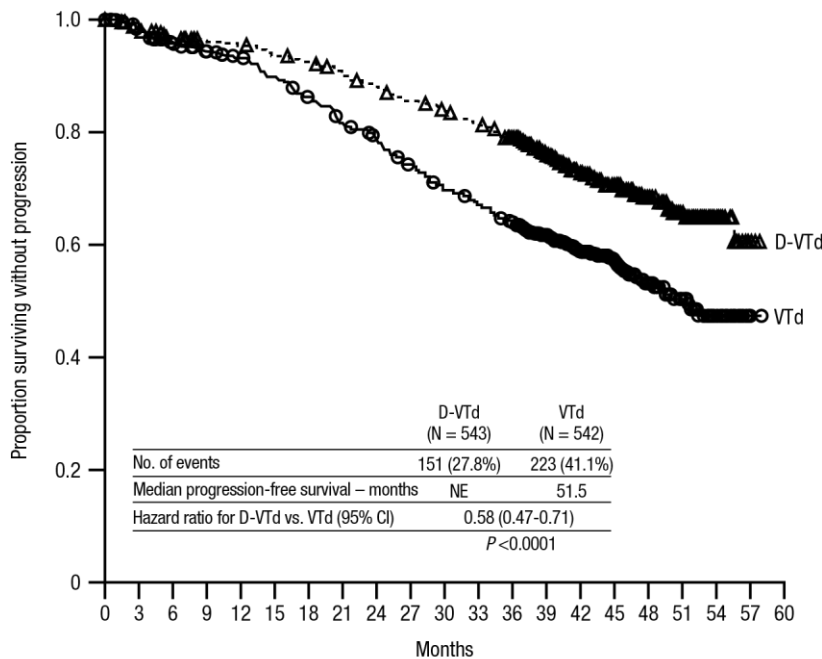


D-VTd=daratumumab-bortezomib-thalidomide-dexamethasone; VTd=bortezomib-thalidomide-dexamethasone; MRD=minimal residual disease; CI=confidence interval; HR = Hazard Ratio

- a Based on intent-to-treat population
- b p-value from Cochran Mantel-Haenszel Chi-Squared test.
- c Based on threshold of  $10^{-5}$
- d Mantel-Haenszel estimate of the common odds ratio for stratified tables is used.
- e Only includes patients who achieved MRD negativity (threshold of  $10^{-5}$ ) and CR or better

With a median follow-up of 18.8 months, the primary analysis of PFS in study MMY3006 demonstrated an improvement in PFS in the DVTd arm as compared to the VTd arm; the median PFS had not been reached in either arm. Treatment with DVTd resulted in a reduction in the risk of progression or death by 53% compared to VTd alone (HR=0.47; 95% CI: 0.33, 0.67;  $p < 0.0001$ ). Results of an updated PFS analysis after a median follow-up of 44.5 months continued to show an improvement in PFS for patients in the DVTd arm compared with the VTd arm. Median PFS was not reached in the DVTd arm and was 51.5 months in the VTd arm (HR=0.58; 95% CI: 0.47, 0.71;  $p < 0.0001$ ), representing a 42% reduction in the risk of disease progression or death in patients treated with DVTd.

**Figure 5: Kaplan-Meier Curve of PFS in Study MMY3006**



No. at risk	0	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
VTd	542	522	499	483	472	454	434	409	391	368	345	330	312	250	191	142	90	60	26	2	0
D-VTd	543	524	507	499	495	485	478	463	452	438	426	413	395	318	237	171	119	76	29	4	0

**Relapsed/Refractory Multiple Myeloma**

*Combination treatment with lenalidomide and dexamethasone*

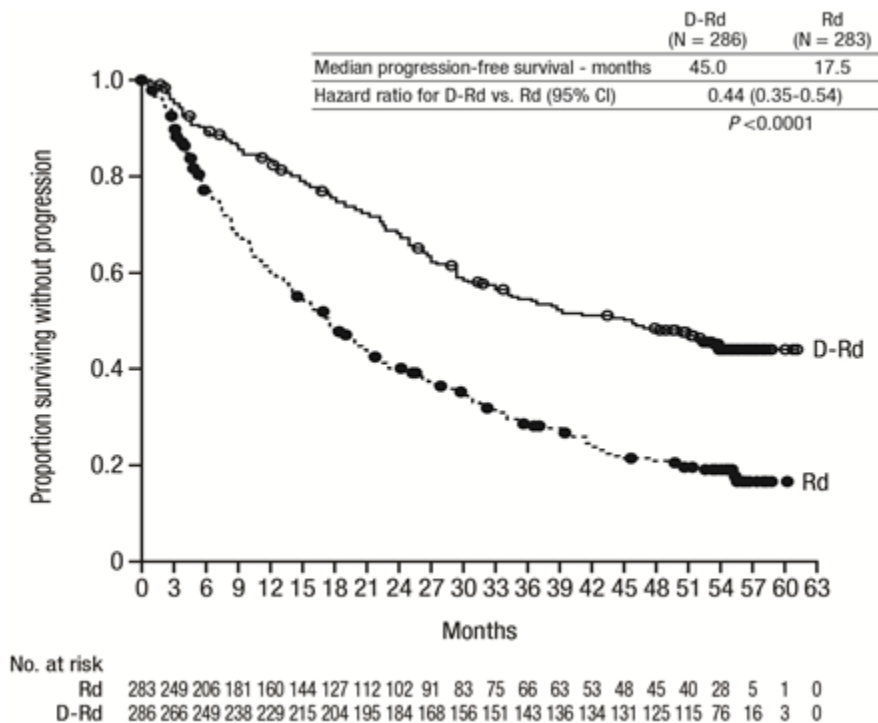
Study MMY3003, an open-label, randomized, active-controlled Phase 3 trial, compared treatment with Daratumumab (Darzalex™) 16 mg/kg in combination with lenalidomide and low-dose dexamethasone (DRd) to treatment with lenalidomide and low-dose dexamethasone (Rd) in patients with multiple myeloma who had received at least one prior therapy. Lenalidomide (25 mg once daily orally on Days 1-21 of repeated 28-day [4-week] cycles) was given with low dose oral or intravenous dexamethasone 40 mg/week (or a reduced dose of 20 mg/week for patients >75 years or BMI <18.5). On Daratumumab

(Darzalex™) infusion days, 20 mg of the dexamethasone dose was given as a pre-infusion medication and the remainder given the day after the infusion. For patients on a reduced dexamethasone dose, the entire 20 mg dose was given as a Daratumumab (Darzalex™) pre-infusion medication. Dose adjustments for lenalidomide and dexamethasone were applied according to manufacturer’s prescribing information. Treatment was continued in both arms until disease progression or unacceptable toxicity.

A total of 569 patients were randomized; 286 to the DRd arm and 283 to the Rd arm. The baseline demographic and disease characteristics were similar between the Daratumumab (Darzalex™) and the control arm. The median patient age was 65 years (range 34 to 89 years), 11% were ≥ 75 years, 59% were male; 69% Caucasian, 18% Asian, and 3% African American. Patients had received a median of 1 prior line of therapy. Sixty-three percent (63%) of patients had received prior autologous stem cell transplantation (ASCT). The majority of patients (86%) received a prior proteasome inhibitor (PI), 55% of patients had received a prior immunomodulatory agent (IMiD), including 18% of patients who had received prior lenalidomide, and 44% of patients had received both a prior PI and IMiD. At baseline, 27% of patients were refractory to the last line of treatment. Eighteen percent (18%) of patients were refractory to a PI only, and 21% were refractory to bortezomib. Efficacy was evaluated by PFS based on IMWG criteria.

With a median follow-up of 13.5 months, the primary analysis of PFS in study MMY3003 demonstrated an improvement in PFS in the DRd arm as compared to the Rd arm; the median PFS had not been reached in the DRd arm and was 18.4 months in the Rd arm (HR=0.37; 95% CI: 0.27, 0.52; p<0.0001) representing 63% reduction in the risk of disease progression or death in patients treated with DRd. Results of an updated PFS analysis after a median follow-up of 55 months continued to show an improvement in PFS for patients in the DRd arm compared with the Rd arm. Median PFS was 45.0 months in the DRd arm and 17.5 months in the Rd arm (HR=0.44; 95% CI: 0.35, 0.54; p<0.0001), representing a 56% reduction in the risk of disease progression or death in patients treated with DRd.

**Figure 6: Kaplan-Meier Curve of PFS in Study MMY3003**



Additional efficacy results from Study MMY3003 are presented in the table below.

**Table 4: Additional efficacy results from Study MMY3003**

Response evaluable patient number	DRd (n=281)	Rd (n=276)
Overall response (sCR+CR+VGPR+PR) n(%)	261 (92.9)	211 (76.4)
p-value <sup>a</sup>	<0.0001	
Stringent complete response (sCR)	51 (18.1)	20 (7.2)
Complete response (CR)	70 (24.9)	33 (12.0)
Very good partial response (VGPR)	92 (32.7)	69 (25.0)
Partial response (PR)	48 (17.1)	89 (32.2)
Median Time to Response [months (95% CI)]	1.0 (1.0, 1.1)	1.3 (1.1, 1.9)
Median Duration of Response [months (95% CI)]	NE (NE, NE)	17.4 (17.4, NE)
MRD negative rate (95% CI) <sup>b</sup> (%)	21.0 (16.4, 26.2)	2.8 (1.2, 5.5)
Odds ratio with 95% CI <sup>c</sup>	9.31 (4.31, 20.09)	
P-value <sup>d</sup>	<0.0001	

DRd = daratumumab-lenalidomide-dexamethasone; Rd = lenalidomide-dexamethasone; MRD= minimal residual disease; CI = confidence interval; NE =not estimable.

<sup>a</sup> p-value from Cochran Mantel-Haenszel Chi-Squared test.

<sup>b</sup> Based on Intent-to-treat population and threshold of 10<sup>-5</sup>

<sup>c</sup> Mantel-Haenszel estimate of the common odds ratio is used. An odds ratio > 1 indicates an advantage for DRd.

<sup>d</sup> p-value is from a likelihood-ratio Fisher's exact test.

With an overall median follow-up of 13.5 months, the hazard ratio for Overall Survival (OS) was 0.64 (95% CI: 0.40, 1.01; p=0.0534). The 18-month OS rate was 86% (95% CI: 79.9, 90.5) for patients in the DRd arm versus 76% (95% CI: 79.9, 90.5) in the Rd group.

#### *Combination treatment with bortezomib and dexamethasone*

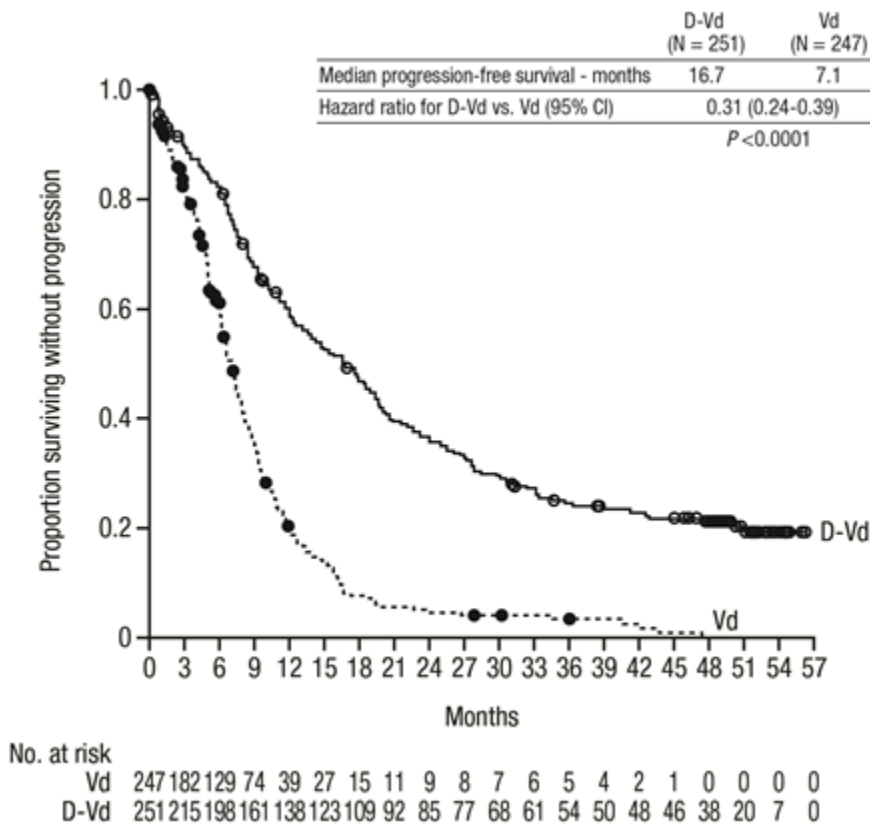
Study MMY3004, an open-label, randomized, active-controlled Phase 3 trial, compared treatment with Daratumumab (Darzalex™) 16 mg/kg in combination with bortezomib and dexamethasone (DvD), to treatment with bortezomib and dexamethasone (Vd) in patients with multiple myeloma who had received at least one prior therapy. Bortezomib was administered by SC injection or IV injection at a dose of 1.3 mg/m<sup>2</sup> body surface area twice weekly for two weeks (Days 1, 4, 8, and 11) of repeated 21 day (3-week) treatment cycles, for a total of 8 cycles. Dexamethasone was administered orally at a dose of 20 mg on Days 1, 2, 4, 5, 8, 9, 11, and 12 of the 8 bortezomib cycles (80 mg/week for two out of three weeks of each of the bortezomib cycle) or a reduced dose of 20 mg/week for patients >75 years, BMI <18.5, poorly controlled diabetes mellitus or prior intolerance to steroid therapy. On the days of Daratumumab (Darzalex™) infusion, 20 mg of the dexamethasone dose was administered as a pre-infusion medication. For patients on a reduced dexamethasone dose, the entire 20 mg dose was given as a Daratumumab (Darzalex™) pre-infusion medication. Bortezomib and dexamethasone were given for 8 three-week cycles in both treatment arms; whereas Daratumumab (Darzalex™) was given until treatment progression. However, dexamethasone 20 mg was continued as a Daratumumab (Darzalex™) pre-infusion medication in the DvD arm. Dose adjustments for bortezomib and dexamethasone were applied according to manufacturer's prescribing information.

A total of 498 patients were randomized; 251 to the DvD arm and 247 to the Vd arm. The baseline demographic and disease characteristics were similar between the Daratumumab (Darzalex™) and the control arm. The median patient age was 64 years (range 30 to 88 years); 12% were ≥ 75 years, 57% were

male; 87% Caucasian, 5% Asian and 4% African American. Patients had received a median of 2 prior lines of therapy and 61% of patients had received prior autologous stem cell transplantation (ASCT). Sixty-nine percent (69%) of patients had received a prior PI (66% received bortezomib) and 76% of patients received an IMiD (42% received lenalidomide). At baseline, 32% of patients were refractory to the last line of treatment and the proportions of patients refractory to any specific prior therapy were well balanced between the treatment groups. Thirty-three percent (33%) of patients were refractory to an IMiD only, and 28% were refractory to lenalidomide. Efficacy was evaluated by PFS based on IMWG criteria.

With a median follow-up of 7.4 months, the primary analysis of PFS in study MMY3004 demonstrated an improvement in the DVd arm as compared to the Vd arm; the median PFS had not been reached in the DVd arm and was 7.2 months in the Vd arm (HR [95% CI]: 0.39 [0.28, 0.53]; p-value < 0.0001), representing a 61% reduction in the risk of disease progression or death for patients treated with DVd versus Vd. Results of an updated PFS analysis after a median follow-up of 50 months continued to show an improvement in PFS for patients in the DVd arm compared with the Vd arm. Median PFS was 16.7 months in the DVd arm and 7.1 months in the Vd arm (HR [95% CI]: 0.31 [0.24, 0.39]; p-value <0.0001), representing a 69% reduction in the risk of disease progression or death in patients treated with DVd versus Vd.

**Figure 7: Kaplan-Meier Curve of PFS in Study MMY3004**



Additional efficacy results from Study MMY3004 are presented in the table below.

**Table 5: Additional efficacy results from Study MMY3004**

Response evaluable patient number	DVd (n=240)	Vd (n=234)

Overall response (sCR+CR+VGPR+PR) n(%)	199 (82.9)	148 (63.2)
P-value <sup>a</sup>	<0.0001	
Stringent complete response (sCR)	11 (4.6)	5 (2.1)
Complete response (CR)	35 (14.6)	16 (6.8)
Very good partial response (VGPR)	96 (40.0)	47 (20.1)
Partial response (PR)	57 (23.8)	80 (34.2)
Median Time to Response [months (range)]	0.9 (0.8, 1.4)	1.6 (1.5, 2.1)
Median Duration of Response [months (95% CI)]	NE (11.5, NE)	7.9 (6.7, 11.3)
MRD negative rate (95% CI) <sup>b</sup> (%)	8.8 (5.6, 13.0)	1.2 (0.3, 3.5)
Odds ratio with 95% CI <sup>c</sup>	9.04 (2.53, 32.21)	
P-value <sup>d</sup>	0.0001	

DVd = daratumumab- bortezomib-dexamethasone; Vd = bortezomib-dexamethasone; MRD= minimal residual disease; CI = confidence interval; NE =not estimable

<sup>a</sup> p-value from Cochran Mantel-Haenszel Chi-Squared test.

<sup>b</sup> Based on Intent-to-treat population and threshold of 10<sup>-5</sup>

<sup>c</sup> Mantel-Haenszel estimate of the common odds ratio is used. An odds ratio > 1 indicates an advantage for DVd.

<sup>d</sup> p-value is from Fisher's exact test

Median OS was not reached for either treatment group. With an overall median follow-up of 7.4 months (95% CI: 0.0, 14.9), the hazard ratio for OS was 0.77 (95% CI: 0.47, 1.26; p=0.2975).

### Monotherapy

The clinical efficacy and safety of Daratumumab (Darzalex™) for the treatment of patients with relapsed and refractory multiple myeloma whose prior therapy included a proteasome inhibitor and an immunomodulatory agent, was demonstrated in two open-label studies.

In Study MMY2002, 106 patients with relapsed and refractory multiple myeloma received 16 mg/kg Daratumumab (Darzalex™) until disease progression. The median patient age was 63.5 years (range, 31 to 84 years), 49% were male and 79% were Caucasian. Patients had received a median of 5 prior lines of therapy. Eighty percent of patients had received prior autologous stem cell transplantation (ASCT). Prior therapies included bortezomib (99%), lenalidomide (99%), pomalidomide (63%) and carfilzomib (50%). At baseline, 97% of patients were refractory to the last line of treatment, 95% were refractory to both, a proteasome inhibitor (PI) and immunomodulatory agent (IMiD), 77% were refractory to alkylating agents, 63% were refractory to pomalidomide and 48% of patients were refractory to carfilzomib.

Efficacy results based on Independent Review Committee (IRC) assessment are presented in the table below.

**Table 6: IRC assessed efficacy results for study MMY2002**

Efficacy Endpoint	Daratumumab (Darzalex™) 16 mg/kg N=106
Overall response rate <sup>1</sup> (ORR: sCR+CR+VGPR+PR) [n (%)] 95% CI (%)	31 (29.2) (20.8, 38.9)
Stringent complete response (sCR) [n (%)]	3 (2.8)
Complete response (CR) [n]	0
Very good partial response (VGPR) [n (%)]	10 (9.4)
Partial response (PR) [n (%)]	18 (17.0)
Clinical Benefit Rate (ORR+MR)	36 (34.0)
Median Duration of Response [months (95% CI)]	7.4 (5.5, NE)

Median Time to Response [months (range)]	1 (0.9; 5.6)
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<sup>1</sup>Primary efficacy endpoint (International Myeloma Working Group criteria)

CI = confidence interval; NE = not estimable; MR = minimal response

Overall response rate (ORR) in MMY2002 was similar regardless of type of prior anti-myeloma therapy. With a median duration of follow-up of 9 months, median Overall Survival (OS) was not reached. The 12-month OS rate was 65% (95% CI: 51.2, 75.5).

In Study GEN501, 42 patients with relapsed and refractory multiple myeloma received 16 mg/kg Daratumumab (Darzalex™) until disease progression. The median patient age was 64 years (range, 44 to 76 years), 64% were male and 76% were Caucasian. Patients in the study had received a median of 4 prior lines of therapy. Seventy-four percent of patients had received prior ASCT. Prior therapies included bortezomib (100%), lenalidomide (95%), pomalidomide (36%) and carfilzomib (19%). At baseline, 76% of patients were refractory to the last line of treatment, 64% were refractory to both a PI and IMiD, 60% were refractory to alkylating agents, 36% were refractory to pomalidomide and 17% were refractory to carfilzomib.

Treatment with daratumumab at 16 mg/kg led to a 36% ORR with 5% CR and 5% VGPR. The median time to response was 1 (range: 0.5 to 3.2) month. The median duration of response was not reached (95% CI: 5.6 months, not estimable). With a median duration of follow-up of 10 months, median OS was not reached. The 12-month OS rate was 77% (95% CI: 58.0, 88.2).

#### PHARMACOKINETIC PROPERTIES

The pharmacokinetics (PK) of daratumumab following intravenous administration of Daratumumab (Darzalex™) were evaluated in patients with relapsed and refractory multiple myeloma at dose levels from 0.1 mg/kg to 24 mg/kg. A population PK model of daratumumab was developed to describe the PK characteristics of daratumumab and to evaluate the influence of covariates on the disposition of daratumumab in patients with multiple myeloma. The population PK analysis included 223 patients receiving Daratumumab (Darzalex™) in two clinical trials (150 subjects received 16 mg/kg).

In the 1- to 24 mg/kg cohorts, peak serum concentrations ( $C_{max}$ ) after the first dose increased in approximate proportion to dose and volume of distribution was consistent with initial distribution into the plasma compartment. Increases in AUC were more than dose-proportional and clearance (CL) decreased with increasing dose. These observations suggest CD38 may become saturated at higher doses, after which the impact of target binding clearance is minimized and the clearance of daratumumab approximates the linear clearance of endogenous IgG1. Clearance also decreased with multiple doses, which may be related to tumor burden decreases.

Terminal half-life increases with increasing dose and with repeated dosing. The mean (standard deviation [SD]) estimated terminal half-life of daratumumab following the first 16 mg/kg dose was 9 (4.3) days. Based on population PK analysis, the mean (SD) half-life associated with non-specific linear elimination was approximately 18 (9) days; this is the terminal half-life that can be expected upon complete saturation of target mediated clearance and repeat dosing of daratumumab.

At the end of weekly dosing for the recommended schedule and dose of 16 mg/kg, the mean (SD) serum  $C_{max}$  value was 915 (410.3) micrograms/mL, approximately 2.9-fold higher than following the first infusion. The mean (SD) predose (trough) serum concentration at the end of weekly dosing was 573 (331.5) micrograms/mL.

Based on the population PK analysis of Daratumumab (Darzalex™) monotherapy, daratumumab steady state is achieved approximately 5 months into the every 4-week dosing period (by the 21<sup>st</sup> infusion), and the mean (SD) ratio of  $C_{max}$  at steady-state to  $C_{max}$  after the first dose was 1.6 (0.5). The mean (SD) central volume of distribution is 56.98 (18.07) mL/kg.

Three additional population PK analyses were conducted in patients with multiple myeloma that received daratumumab in various combination therapies (N=1390). Daratumumab concentration-time profiles were similar following the monotherapy and combination therapies. The mean estimated terminal half-life associated with linear clearance in combination therapy was approximately 15-23 days.

Based on population PK analysis body weight was identified as a statistically significant covariate for daratumumab clearance. Therefore, body weight based dosing is an appropriate dosing strategy for the multiple myeloma patients.

Simulation of daratumumab pharmacokinetics was conducted for all recommended dosing schedules using individual PK parameters of patients with multiple myeloma (n=1309). The simulation results confirmed that the split and single dosing for the first dose should provide similar PK, with the exception of the PK profile in the first day of the treatment.

### **Special populations**

#### ***Age and gender***

Based on population PK analyses in patients receiving monotherapy or various combination therapies, age (range: 31-93 years) had no clinically important effect on the PK of daratumumab, and the exposure of daratumumab was similar between younger (aged <65 years, n=518) and older (aged ≥65 to <75 years, n=761; aged ≥75 years, n=334) patients.

Gender did not affect exposure of daratumumab to a clinically relevant degree in population PK analyses.

#### ***Renal impairment***

No formal studies of Daratumumab (Darzalex™) in patients with renal impairment have been conducted. Population PK analyses were performed based on pre-existing renal function data in patients receiving Daratumumab (monotherapy or various combination therapies, including 441 patients with normal renal function (creatinine clearance [CrCl] ≥90 mL/min), 78 with mild renal impairment (CrCl <90 and ≥60 mL/min), 68 with moderate renal impairment (CrCl <60 and ≥30 mL/min), and 6 with severe renal impairment (CrCl <30 mL/min). No clinically important differences in exposure to daratumumab were observed between patients with renal impairment and those with normal renal function.

#### ***Hepatic impairment***

No formal studies of Daratumumab (Darzalex™) in patients with hepatic impairment have been conducted. Population PK analyses were performed in patients receiving daratumumab monotherapy or various combination therapies, including 1404 patients with normal hepatic function (total bilirubin [TB] and aspartate aminotransferase [AST] ≤ upper limit of normal [ULN]), 189 with mild hepatic impairment (TB 1.0× to 1.5× ULN or AST >ULN) and 8 patients with moderate (TB >1.5× to 3.0× ULN; n=7) or severe (TB >3.0× ULN; n=1) hepatic impairment. No clinically important difference in the exposure to daratumumab were observed between patients with hepatic impairment and those with normal hepatic function.

### **Race**

Based on the population PK analyses in patients receiving either daratumumab monotherapy or various combination therapies, the exposure to daratumumab was similar between white (n=1371) and non-white (n=242) subjects.

### **NON-CLINICAL INFORMATION**

#### **Carcinogenicity and Mutagenicity**

No animal studies have been performed to establish the carcinogenic potential of daratumumab. Routine genotoxicity and carcinogenicity studies are generally not applicable to biologic pharmaceuticals as large proteins cannot diffuse into cells and cannot interact with DNA or chromosomal material.

#### **Reproductive Toxicology**

No animal studies have been performed to evaluate the potential effects of daratumumab on reproduction or development.

#### **Fertility**

No animal studies have been performed to determine potential effects on fertility in males or females.

### **THERAPEUTIC INDICATION**

Daratumumab (Darzalex™) is indicated for the treatment of patients with multiple myeloma.

### **DOSAGE AND METHOD OF ADMINISTRATION**

Daratumumab (Darzalex™) should be administered by a healthcare professional, with immediate access to emergency equipment and appropriate medical support to manage infusion-related reactions (IRRs) if they occur.

Pre- and post-infusion medications should be administered (see **Recommended concomitant medications** below).

#### **Dosage – Adults (≥18 years)**

##### **Recommended dose**

The Daratumumab (Darzalex™) dosing schedule in Table 7 is for combination therapy with 4-week cycle regimens (e.g. lenalidomide) and for monotherapy as follows:

- combination therapy with lenalidomide and low-dose dexamethasone for patients with newly diagnosed multiple myeloma ineligible for autologous stem cell transplant (ASCT)
- combination therapy with lenalidomide and low-dose dexamethasone for patients with relapsed/refractory multiple myeloma
- monotherapy for patients with relapsed/refractory multiple myeloma

The recommended dose is Daratumumab (Darzalex™) 16 mg/kg body weight administered as an intravenous infusion according to the following dosing schedule (infusion rates presented in Table 11):



**Table 7: Daratumumab (Darzalex™) dosing schedule for monotherapy and in combination with 4-week cycle dosing regimens**

Weeks	Schedule
Weeks 1 to 8	Weekly (total of 8 doses)
Weeks 9 to 24 <sup>a</sup>	every two weeks (total of 8 doses)
Week 25 onwards until disease progression <sup>b</sup>	every four weeks

<sup>a</sup> First dose of the every-2-week-dosing schedule is given at Week 9

<sup>b</sup> First dose of the every-4 week-dosing schedule is given at Week 25

For dosing instructions of medicinal products administered with Daratumumab (Darzalex™), see *Clinical Studies* and manufacturer's prescribing information.

The Daratumumab (Darzalex™) dosing schedule in Table 8 is for combination therapy with bortezomib, melphalan and prednisone (6-week cycle regimen) for patients with newly diagnosed multiple myeloma ineligible for ASCT.

The recommended dose is Daratumumab (Darzalex™) 16 mg/kg body weight administered as an intravenous infusion according to the following dosing schedule (infusion rates presented in Table 11):

**Table 8: Daratumumab (Darzalex™) dosing schedule in combination with bortezomib, melphalan and prednisone ([VMP]; 6-week cycle dosing regimen)**

Weeks	Schedule
Weeks 1 to 6	Weekly (total of 6 doses)
Weeks 7 to 54 <sup>a</sup>	Every three weeks (total of 16 doses)
Week 55 onwards until disease progression <sup>b</sup>	Every four weeks

<sup>a</sup> First dose of the every-3-week dosing schedule is given at Week 7

<sup>b</sup> First dose of the every-4-week dosing schedule is given at Week 55

Bortezomib is given twice weekly at Weeks 1, 2, 4 and 5 for the first 6-week cycle, followed by **once** weekly at Weeks 1, 2, 4 and 5 for eight more 6-week cycles. For information on the VMP dose and dosing schedule when administered with Daratumumab (Darzalex™), see *Clinical Studies*.

The Daratumumab (Darzalex™) dosing schedule in Table 9 is for combination therapy with bortezomib, thalidomide and dexamethasone (4-week cycle regimens) for treatment of newly diagnosed patients eligible for ASCT.

The recommended dose is Daratumumab (Darzalex™) 16 mg/kg body weight administered as an intravenous infusion according to the following dosing schedule (infusion rates presented in Table 11).

**Table 9: Daratumumab (Darzalex™) dosing schedule in combination with bortezomib, thalidomide and dexamethasone ([VTd]; 4-week cycle dosing regimen)**

Treatment phase	Weeks	Schedule
Induction	Weeks 1 to 8	weekly (total of 8 doses)
	Weeks 9 to 16 <sup>a</sup>	every two weeks (total of 4 doses)

Stop for high dose chemotherapy and ASCT		
Consolidation	Weeks 1 to 8 <sup>b</sup>	every two weeks (total of 4 doses)

a First dose of the every-2-week dosing schedule is given at Week 9

b First dose of the every-2-week dosing schedule is given at Week 1 upon re-initiation of treatment following ASCT

For dosing instructions of medicinal products administered with Daratumumab (Darzalex™), see *Clinical Studies* and manufacturer's prescribing information.

The Daratumumab (Darzalex™) dosing schedule in Table 10 is for combination therapy with 3-week cycle regimens (e.g. bortezomib) for patients with relapsed/refractory multiple myeloma.

The recommended dose is Daratumumab (Darzalex™) 16 mg/kg body weight administered as an intravenous infusion according to the following dosing schedule (infusion rates presented in Table 11):

**Table 10: Dosing schedule for Daratumumab (Darzalex™) with 3-week cycle dosing regimens**

Weeks	Schedule
Weeks 1 to 9	Weekly (total of 9 doses)
Weeks 10 to 24 <sup>a</sup>	every two weeks (total of 5 doses)
Week 25 onwards until disease progression <sup>b</sup>	every four weeks

<sup>a</sup> First dose of the every-3-week-dosing schedule is given at Week 10

<sup>b</sup> First dose of the every-4 week-dosing schedule is given at Week 25

For dosing instructions for medicinal products administered with Daratumumab (Darzalex™) see *Clinical Studies* and manufacturer's prescribing information.

### **Missed dose(s)**

If a planned dose of Daratumumab (Darzalex™) is missed, administer the dose as soon as possible and adjust the dosing schedule accordingly, maintaining the treatment interval.

### **Dose modifications**

No dose reductions of Daratumumab (Darzalex™) are recommended. Dose delay may be required to allow recovery of blood cell counts in the event of hematological toxicity (see **Warnings and Precautions**). For information concerning medicinal products given in combination with Daratumumab (Darzalex™), see manufacturer's prescribing information.

### **Recommended concomitant medications**

#### *Pre-infusion medication*

Administer the following pre-infusion medications to reduce the risk of IRRs to all patients approximately 1-3 hours prior to every infusion of Daratumumab (Darzalex™):

- Corticosteroid (long-acting or intermediate-acting)

Monotherapy:

Methylprednisolone 100 mg, or equivalent, administered intravenously. Following the second infusion, the dose of corticosteroid may be reduced (oral or intravenous methylprednisolone 60 mg)

Combination therapy:

Administer 20 mg dexamethasone (or equivalent) prior to every Daratumumab (Darzalex™) infusion. When dexamethasone is the background-regimen specific corticosteroid, the dexamethasone treatment dose will instead serve as pre-medication on Daratumumab (Darzalex™) infusion days (see **Clinical Studies**).

Dexamethasone is given intravenously prior to the first Daratumumab (Darzalex™) infusion and oral administration may be considered prior to the subsequent infusions. Additional background-regimen specific corticosteroids (e.g. prednisone) should not be taken on Daratumumab (Darzalex™) infusion days when patients have received dexamethasone as a pre-medication.

- Antipyretics (oral paracetamol/acetaminophen 650 to 1000 mg)
- Antihistamine (oral or intravenous diphenhydramine 25 to 50 mg or equivalent)

#### *Post-infusion medication*

Administer post-infusion medication to reduce the risk of delayed infusion-related reactions as follows:

Monotherapy:

Administer oral corticosteroid (20 mg methylprednisolone or equivalent dose of an intermediate-acting or long-acting corticosteroid in accordance with local standards) on each of the 2 days following all Daratumumab (Darzalex™) infusions (beginning the day after the infusion).

Combination therapy:

Consider administering low-dose oral methylprednisolone ( $\leq 20$  mg) or equivalent the day after the Daratumumab (Darzalex™) infusion.

However, if a background regimen-specific corticosteroid (e.g. dexamethasone, prednisone) is administered the day after the Daratumumab (Darzalex™) infusion, additional post-infusion medications may not be needed (see **Clinical Studies**).

Additionally, for patients with a history of chronic obstructive pulmonary disease, consider the use of post-infusion medications including short and long acting bronchodilators, and inhaled corticosteroids. Following the first four infusions, if the patient experiences no major IRRs, these post-infusion medications may be discontinued at the discretion of the physician.

#### *Prophylaxis for herpes zoster virus reactivation*

Anti-viral prophylaxis should be considered for the prevention of herpes zoster virus reactivation.

#### **Special populations**

##### ***Pediatrics (17 years of age and younger)***

The safety and efficacy of Daratumumab (Darzalex™) have not been established in pediatric patients.

##### ***Elderly (65 years of age and older)***

No dose adjustments are considered necessary in elderly patients (see **Pharmacokinetic Properties, Adverse Reactions**).

##### ***Renal impairment***

No formal studies of daratumumab in patients with renal impairment have been conducted. Based on a population pharmacokinetic (PK) analysis, no dosage adjustment is necessary for patients with renal

impairment (see **Pharmacokinetic Properties**).

### **Hepatic impairment**

No formal studies of daratumumab in patients with hepatic impairment have been conducted. Changes in hepatic function are unlikely to have any effect on the elimination of daratumumab since IgG1 molecules such as daratumumab are not metabolized through hepatic pathways. Based on a population PK analysis, no dosage adjustments are necessary for patients with hepatic impairment (see **Pharmacokinetic Properties**).

### **Administration**

Daratumumab (Darzalex™) is administered as an intravenous infusion following dilution with 0.9% Sodium Chloride. For instructions on dilution of the medicinal product before administration, see **Instructions for Use and Handling and Disposal**.

Following dilution the Daratumumab (Darzalex™) infusion should be intravenously administered at the appropriate initial infusion rate, as presented in Table 11 below. Incremental escalation of the infusion rate should be considered only in the absence of infusion reactions.

To facilitate administration, the first prescribed 16 mg/kg dose at Week 1 may be split over two consecutive days, i.e. 8 mg/kg on Day 1 and Day 2, respectively, see Table 11 below.

**Table 11: Infusion rates for Daratumumab (Darzalex™) (16 mg/kg) administration**

	<b>Dilution Volume</b>	<b>Initial Infusion Rate (first hour)</b>	<b>Rate Increment<sup>a</sup></b>	<b>Maximum Rate</b>
<b>Week 1 Infusion</b>				
<i>Option 1 (Single dose infusion)</i>				
Week 1 Day 1 (16 mg/kg)	1000 mL	50 mL/hour	50 mL/hour every hour	200 mL/hour
<i>Option 2 (Split dose infusion)</i>				
Week 1 Day 1 (8 mg/kg)	500 mL	50 mL/hour	50 mL/hour every hour	200 mL/hour
Week 1 Day 2 (8 mg/kg)	500 mL	50 mL/hour	50 mL/hour every hour	200 mL/hour
<b>Week 2 (16 mg/kg) infusion<sup>b</sup></b>	500 mL	50 mL/hour	50 mL/hour every hour	200 mL/hour
<b>Subsequent (Week 3 onwards, 16 mg/kg) infusions<sup>c</sup></b>	500 mL	100 mL/hour	50 mL/hour every hour	200 mL/hour

<sup>a</sup> Consider incremental escalation of the infusion rate only in the absence of infusion reactions

<sup>b</sup> Dilution volume of 500 mL for the 16 mg/kg dose should be used only if there were no infusion reactions the previous week. Otherwise, continue to use a dilution volume of 1000 mL.

<sup>c</sup> Use a modified initial rate (100 mL/hour) for subsequent infusions (i.e. Week 3 onwards) only if there were no infusion reactions during the previous infusion. Otherwise, continue to use instructions indicated in the table for the Week 2 infusion rate.

### **Management of infusion-related reactions**

Administer pre-infusion medications to reduce the risk of IRRs prior to treatment with Daratumumab (Darzalex™).

For IRRs of any grade/severity, immediately interrupt the Daratumumab (Darzalex™) infusion and manage symptoms.

Management of IRRs may further require reduction in the rate of infusion, or treatment discontinuation of Daratumumab (Darzalex™) as outlined below (see also **Warnings and Precautions**).

- Grade 1-2 (mild to moderate): Once reaction symptoms resolve, resume the infusion at no more than half the rate at which the IRR occurred. If the patient does not experience any further IRR symptoms, infusion rate escalation may resume at increments and intervals as clinically appropriate up to the maximum rate of 200 mL/hour (Table 11).
- Grade 3 (severe): Once reaction symptoms resolve, consider restarting the infusion at no more than half the rate at which the reaction occurred. If the patient does not experience additional symptoms, resume infusion rate escalation at increments and intervals as appropriate (Table 11). Repeat the procedure above in the event of recurrence of Grade 3 symptoms. Permanently discontinue Daratumumab (Darzalex™) upon the third occurrence of a Grade 3 or greater infusion reaction.
- Grade 4 (life-threatening): Permanently discontinue Daratumumab (Darzalex™) treatment.

### **CONTRAINDICATIONS**

Patients with a history of severe hypersensitivity to daratumumab or any of the excipients.

### **WARNINGS AND PRECAUTIONS**

#### **Infusion-related reactions**

Daratumumab (Darzalex™) can cause seriously IRRs, including anaphylactic reactions. These reactions can be life-threatening and fatal outcomes have been reported.

Monitor patients throughout the infusion and the post-infusion period.

In clinical trials, IRRs were reported in approximately half of all patients treatment with Daratumumab (Darzalex™).

The majority of IRRs occurred at the first infusion and were Grade 1-2. Four percent of patients had an IRR at more than one infusion. Severe reactions have occurred, including bronchospasm, hypoxia, dyspnea and hypertension, laryngeal edema and pulmonary edema. Signs and symptoms may include respiratory symptoms, such as nasal congestion, cough, throat irritation as well as chills, vomiting and nausea. Less common symptoms were wheezing, allergic rhinitis, pyrexia, chest discomfort, pruritis, and hypotension (see **Adverse Reactions**). Fatal IRRs were not reported in these trials.

Pre-medicate patients with antihistamines, antipyretics and corticosteroids to reduce the risk of IRRs prior to treatment with Daratumumab (Darzalex™). Interrupt Daratumumab (Darzalex™) infusion for IRRs of any severity and institute medical management/supportive treatment as needed. For patients with Grade 1, 2, or 3 reactions, reduce the infusion rate when re-starting the infusion. If an anaphylactic reaction or life-threatening (Grade 4) IRR occurs, permanently discontinue administration of Daratumumab (Darzalex™) and institute appropriate emergency care (see **Dosage and Method of Administration**).

To reduce the risk of delayed IRRs, administer oral corticosteroids to all patients following all infusions. Additionally consider the use of post-infusion medications (e.g. inhaled corticosteroids, short and long acting bronchodilators) for patients with a history of obstructive pulmonary disorder to manage respiratory complications should they occur (see **Dosage and Method of Administration**).

#### **Neutropenia/Thrombocytopenia**

Daratumumab (Darzalex™) may increase neutropenia and thrombocytopenia induced by background therapy (see **Adverse Reactions**).

Monitor complete blood cell counts periodically during treatment according to manufacturer's prescribing information for background therapies. Monitor patients with neutropenia for signs of infection. Daratumumab (Darzalex™) dose delay may be required to allow recovery of blood cell counts. No dose reduction of Daratumumab (Darzalex™) is recommended. Consider supportive care with transfusions or growth factors.

#### **Interference with indirect antiglobulin test (indirect Coombs test)**

Daratumumab binds to CD38 found at low levels on red blood cells (RBCs) and may result in a positive indirect Coombs test. Daratumumab-mediated positive indirect Coombs test may persist for up to 6 months after the last daratumumab infusion. It should be recognized that daratumumab bound to RBCs may mask detection of antibodies to minor antigens in the patient's serum. The determination of a patient's ABO and Rh blood type are not impacted.

Type and screen patients prior to starting Daratumumab (Darzalex™).

In the event of a planned transfusion notify blood transfusion centers of this interference with indirect antiglobulin tests (see **Interactions**). If an emergency transfusion is required, non-cross-matched ABO/RhD-compatible RBCs can be given per local blood bank practices.

#### **Hepatitis B Virus (HBV) reactivation**

Hepatitis B virus (HBV) reactivation, in some cases fatal, has been reported in patients treated with Daratumumab (Darzalex™). HBV screening should be performed in all patients before initiation of treatment with Daratumumab (Darzalex™).

For patients with evidence of positive HBV serology, monitor for clinical and laboratory signs of HBV reactivation during, and for at least six months following the end of Daratumumab (Darzalex™) treatment. Manage patients according to current clinical guidelines. Consider consulting a hepatitis disease expert as clinical indicated.

In patients who develop reactivation of HBV while on Daratumumab (Darzalex™), suspend treatment with Daratumumab (Darzalex™) and any concomitant steroids, chemotherapy, and institute appropriate treatment. Resumption of Daratumumab (Darzalex™) treatment in patients who HBV reactivation is adequately controlled should be discussed with physicians with expertise in managing HBV.

## **INTERACTIONS**

No drug-drug interaction studies have been performed.

Clinical pharmacokinetic assessment of daratumumab in combination with lenalidomide, thalidomide, bortezomib and dexamethasone indicated no clinically-relevant drug-drug interaction between daratumumab and these small molecule medicinal products.

#### **Effects of Daratumumab (Darzalex™) on laboratory tests**

##### ***Interference with indirect antiglobulin test (indirect Coombs test)***

Daratumumab binds to CD38 on RBCs and interferes with compatibility testing, including antibody screening and cross matching. Daratumumab interference mitigation methods include treating reagent

RBCs with dithiothreitol (DTT) to disrupt daratumumab binding or genotyping. Since the Kell blood group system is also sensitive to DTT treatment, Kell-negative units should be supplied after ruling out or identifying alloantibodies using DTT-treated RBCs.

#### ***Interference with serum protein electrophoresis and immunofixation tests***

Daratumumab may be detected on serum protein electrophoresis (SPE) and immunofixation (IFE) assays used for monitoring disease monoclonal immunoglobulins (M protein). This can lead to false positive SPE and IFE assay results for patients with IgG kappa myeloma protein impacting initial assessment of Complete Responses (CRs) by International Myeloma Working Group (IMWG) criteria. In patients with persistent very good partial response (VGPR), where daratumumab interference is suspected, consider using a validated daratumumab-specific IFE assay to distinguish daratumumab from any remaining endogenous M protein in the patient's serum, to facilitate determination of a CR (see ***Clinical Studies***).

### **PREGNANCY, BREAST-FEEDING AND FERTILITY**

#### **Pregnancy**

There are no human or animal data to assess the risk of Daratumumab (Darzalex™) use during pregnancy. IgG1 monoclonal antibodies are known to cross the placenta after the first trimester of pregnancy. Therefore Daratumumab (Darzalex™) should not be used during pregnancy unless the benefit of treatment to the woman is considered to outweigh the potential risks to the fetus. If the patient becomes pregnant while taking this drug, the patient should be informed of the potential risk to the fetus.

To avoid exposure to the fetus, women of reproductive potential should use effective contraception during and for 3 months after cessation of Daratumumab (Darzalex™) treatment.

#### **Breast-feeding**

It is not known whether daratumumab is excreted into human or animal milk or affects milk production. There are no studies to assess the effect of daratumumab on the breast-fed infant.

Maternal IgG is excreted in human milk, but does not enter the neonatal and infant circulations in substantial amounts as they are degraded in the gastrointestinal tract and not absorbed. Because the risks of Daratumumab (Darzalex™) to the infant from oral ingestion are unknown, a decision should be made whether to discontinue breast-feeding, or discontinue Daratumumab (Darzalex™) therapy, taking into account the benefit of breast feeding for the child and the benefit of therapy for the woman.

#### **Fertility**

No data are available to determine potential effects of daratumumab on fertility in males or females.

### **EFFECTS ON ABILITY TO DRIVE AND USE MACHINES**

Daratumumab (Darzalex™) has no or negligible influence on the ability to drive and use machines. However, fatigue has been reported in patients taking daratumumab and this should be taken into account when driving or using machines.

### **ADVERSE REACTIONS**

Throughout this section, adverse reactions are presented. Adverse reactions are adverse events that were considered to be reasonably associated with the use of daratumumab based on the comprehensive assessment of the available adverse event information. A causal relationship with daratumumab cannot be reliably established in individual cases. Further, because clinical

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

The safety data described below reflect exposure to Daratumumab (Darzalex™) (16 mg/kg) in 2459 patients with multiple myeloma including 2303 patients who received Daratumumab (Darzalex™) in combination with background regimens and 156 patients who received Daratumumab (Darzalex™) as monotherapy.

### Newly Diagnosed Multiple Myeloma

#### **Combination treatment with lenalidomide and dexamethasone (DRd)**

Adverse reactions described in the table below reflect exposure to Daratumumab (Darzalex™) for a median treatment duration of 25.3 months (range: 0.1 to 40.44 months) for the daratumumab-lenalidomide-dexamethasone (DRd) group and median treatment duration of 21.3 months (range: 0.03 to 40.64 months) for the lenalidomide-dexamethasone group (Rd) in a Phase 3 active-controlled study (Study MMY3008). The most frequent ( $\geq 20\%$ ) adverse reactions were infusion reactions, diarrhea, constipation, nausea, peripheral edema, fatigue, back pain, asthenia, pyrexia, upper respiratory tract infection, bronchitis, pneumonia, decreased appetite, muscle spasms, peripheral sensory neuropathy, dyspnea and cough. Serious adverse reactions with a 2% greater incidence in the DRd arm compared to the Rd arm were dehydration (DRd 2% vs Rd <1%), bronchitis (DRd 4% vs Rd 2%) and pneumonia (DRd 15% vs Rd 8%).

**Table 12: Adverse reactions reported in Study MMY3008\***

System Organ Class Adverse Reaction	DRd (N=364)			Rd (N=365)		
	Any Grade (%)	Grade 3 (%)	Grade 4 (%)	Any Grade (%)	Grade 3 (%)	Grade 4 (%)
Infusion reactions <sup>a</sup>	41	2	<1	0	0	0
<b>Gastrointestinal disorders</b>						
Diarrhea	57	7	0	46	4	0
Constipation	41	1	<1	36	<1	0
Nausea	32	1	0	23	1	0
Vomiting	17	1	0	12	<1	0
<b>General disorders and administration site conditions</b>						
Peripheral edema <sup>b</sup>	41	2	0	33	1	0
Fatigue	40	8	0	28	4	0
Back pain	34	3	<1	26	3	<1
Asthenia	32	4	0	25	3	<1
Pyrexia	23	2	0	18	2	0
Chills	13	0	0	2	0	0
<b>Infections and infestations</b>						
Upper respiratory tract infection <sup>c</sup>	52	2	<1	36	2	<1
Bronchitis <sup>d</sup>	29	3	0	21	1	0
Pneumonia <sup>e</sup>	26	14	1	14	7	1
Urinary tract infection	18	2	0	10	2	0
<b>Metabolism and nutrition disorders</b>						
Decreased appetite	22	1	0	15	<1	<1



Hyperglycemia	14	6	1	8	3	1
Hypocalcemia	14	1	<1	9	1	1
<b>Musculoskeletal and connective tissue disorders</b>						
Muscle spasms	29	1	0	22	1	0
<b>Nervous system disorders</b>						
Peripheral sensory neuropathy	24	1	0	15	0	0
Headache	19	1	0	11	0	0
Paresthesia	16	0	0	8	0	0
<b>Respiratory, thoracic and mediastinal disorders</b>						
Dyspnea <sup>f</sup>	32	3	<1	20	1	0
Cough <sup>g</sup>	30	<1	0	18	0	0
<b>Vascular disorders</b>						
Hypertension <sup>h</sup>	13	6	<1	7	4	0

Key: D=daratumumab, Rd=lenalidomide-dexamethasone.

<sup>a</sup> Infusion reaction includes terms determined by investigators to be related to infusion, see section on Infusion-related Reactions below

<sup>b</sup> Generalized edema, Gravitational edema, Edema, Edema peripheral, Peripheral swelling

<sup>c</sup> Acute sinusitis, Bacterial rhinitis, Laryngitis, Metapneumovirus infection, Nasopharyngitis, Oropharyngeal candidiasis, Pharyngitis, Respiratory syncytial virus infection, Respiratory tract infection, Respiratory tract infection viral, Rhinitis, Rhinovirus infection, Sinusitis, Tonsillitis, Tracheitis, Upper respiratory tract infection, Viral pharyngitis, Viral rhinitis, Viral upper respiratory tract infection

<sup>d</sup> Bronchiolitis, Bronchitis, Bronchitis viral, Respiratory syncytial virus bronchiolitis, Tracheobronchitis

<sup>e</sup> Atypical pneumonia, Bronchopulmonary aspergillosis, Lung infection, Pneumocystis jirovecii infection, Pneumocystis jirovecii pneumonia, Pneumonia, Pneumonia aspiration, Pneumonia pneumococcal, Pneumonia viral, Pulmonary mycosis

<sup>f</sup> Dyspnea, Dyspnea exertional

<sup>g</sup> Cough, Productive cough

<sup>h</sup> Blood pressure increased, Hypertension

\*Note: Adverse reactions that occurred in  $\geq 10\%$  of patients and with at least a 5% frequency greater in the DRd arm are listed. Hematology laboratory related toxicities were excluded and reported separately in the table below.

Laboratory abnormalities worsening during treatment from baseline listed in the table below.

**Table 13: Treatment-emergent hematology laboratory abnormalities in Study MMY3008**

	DRd (N=364) %			Rd (N=365) %		
	Any Grade	Grade 3	Grade 4	Any Grade	Grade 3	Grade 4
Anemia	47	13	0	57	24	0
Thrombocytopenia	67	6	3	58	7	4
Leukopenia	90	30	5	82	20	4
Neutropenia	91	39	17	77	28	11
Lymphopenia	84	41	11	75	36	6

Key: D=daratumumab, Rd=lenalidomide-dexamethasone.

### **Combination treatment with bortezomib, melphalan and prednisone**

Adverse reactions described in the table below reflect exposure to Daratumumab (Darzalex™) for a median treatment duration of 14.7 months (range: 0 to 25.8 months) for the daratumumab, bortezomib, melphalan and prednisone (D-VMP) group, and median treatment duration of 12 months (range: 0.1 to 14.9 months) for the VMP group in a Phase 3 active-controlled study (Study MMY3007). The most frequent

adverse reactions ( $\geq 20\%$ ) were infusion reactions, upper respiratory tract infection and edema peripheral. Serious adverse reactions with at least a 2% greater incidence in the D-VMP arm compared to the VMP arm were pneumonia (D-VMP 11% vs VMP 4%), upper respiratory tract infection (D-VMP 5% vs VMP 1%), and pulmonary edema (D-VMP 2% vs VMP 0%).

**Table 14: Adverse reactions reported in Study MMY3007\***

System Organ Class Adverse Reaction	D-VMP (N=346)			VMP (N=354)		
	Any Grade (%)	Grade 3 (%)	Grade 4 (%)	Any Grade (%)	Grade 3 (%)	Grade 4 (%)
Infusion reactions <sup>a</sup>	28	4	1	0	0	0
<b>General disorders and administration site conditions</b>						
Edema peripheral <sup>b</sup>	21	1	< 1	14	1	0
<b>Infections and infestations</b>						
Upper respiratory tract infection <sup>b</sup>	48	5	0	28	3	0
Pneumonia <sup>b</sup>	16	12	< 1	6	5	< 1
<b>Respiratory, thoracic and mediastinal disorders</b>						
Cough <sup>b</sup>	16	< 1	0	8	< 1	0
Dyspnea <sup>b</sup>	13	2	1	5	1	0
Pulmonary edema <sup>b</sup>	2	1	< 1	< 1	< 1	0
<b>Vascular disorders</b>						
Hypertension <sup>b</sup>	10	4	< 1	3	2	0

Key: D=daratumumab, VMP=bortezomib-melphalan-prednisone

<sup>a</sup> Infusion reaction includes terms determined by investigators to be related to infusion, see section on Infusion-related Reactions below.

<sup>b</sup> Indicates grouping of preferred terms

\*Note: Adverse reactions that occurred in  $\geq 10\%$  of patients and with at least a 5% frequency greater in the D-VMP arm are listed. In addition, serious adverse reactions are listed if there was at least a 2% greater incidence in the D-VMP arm compared to the VMP arm.

Hematology laboratory related toxicities were excluded and reported separately in the table below

Laboratory abnormalities worsening during treatment from baseline listed in the table below.

**Table 15: Treatment-emergent hematology laboratory abnormalities in Study MMY3007**

	D-VMP (N=346) %			VMP (N=354) %		
	Any Grade	Grade 3	Grade 4	Any Grade	Grade 3	Grade 4
Anemia	47	18	0	50	21	0
Thrombocytopenia	88	27	11	88	26	16
Neutropenia	86	34	10	87	32	11
Lymphopenia	85	46	12	83	44	9

Key: D=daratumumab, VMP=bortezomib-melphalan-prednisone

### **Combination treatment with bortezomib, thalidomide and dexamethasone (DVTd)**

Adverse reactions described in the table below reflect exposure to Daratumumab (Darzalex™) up to day 100 post-transplant in a Phase 3 active-controlled study, Study MMY3006 (see **Clinical Studies**). The median duration of induction/ASCT/consolidation treatment was 8.9 (range: 7.0 to 12.0) months for the DVTd group and 8.7 (range: 6.4 to 11.5) months for the VTd group. The most frequent adverse reactions ( $>20\%$ ) were infusion reactions, nausea, pyrexia, upper respiratory tract infection and bronchitis. Serious

adverse reactions with a 2% greater incidence in the DVTd arm compared to the VTd arm were bronchitis (DVTd 2% vs VTd <1%) and pneumonia (DVTd 6% vs VTd 4%).

**Table 16: Adverse reactions reported in Study MMY3006\***

System Organ Class Adverse Reaction	DVTd (N=536)			VTd (N=538)		
	Any Grade (%)	Grade 3 (%)	Grade 4 (%)	Any Grade (%)	Grade 3 (%)	Grade 4 (%)
Infusion reactions <sup>a</sup>	35	3	<1	0	0	0
<b>Gastrointestinal disorders</b>						
Nausea	30	4	0	24	2	<1
Vomiting	16	2	0	10	2	0
<b>General disorders and administration site conditions</b>						
Pyrexia	26	2	<1	21	2	0
<b>Infections and infestations</b>						
Upper respiratory tract infection <sup>b</sup>	27	1	0	17	1	0
Bronchitis <sup>c</sup>	20	1	0	13	1	0
<b>Respiratory, thoracic and mediastinal disorders</b>						
Cough <sup>d</sup>	17	0	0	9	0	0
<b>Vascular disorders</b>						
Hypertension	10	4	0	5	2	0

Key: D=daratumumab, VTd=bortezomib-thalidomide -dexamethasone.

a Infusion reaction includes terms determined by investigators to be related to infusion, see section on Infusion-related Reactions below

b Laryngitis, Laryngitis viral, Metapneumovirus infection, Nasopharyngitis, Oropharyngeal candidiasis, Pharyngitis, Respiratory syncytial virus infection, Respiratory tract infection, Respiratory tract infection viral, Rhinitis, Rhinovirus infection, Sinusitis, Tonsillitis, Tracheitis, Upper respiratory tract infection, Viral pharyngitis, Viral rhinitis, Viral upper respiratory tract infection

c Bronchiolitis, Bronchitis, Bronchitis chronic, Respiratory syncytial virus bronchitis, Tracheobronchitis

d Cough, Productive cough

\*Note: Adverse reactions that occurred in  $\geq 10\%$  of patients and with at least a 5% frequency greater in the DVTd arm are listed.

Hematology laboratory related toxicities were excluded and reported separately in the table below

Laboratory abnormalities worsening during treatment from baseline listed in the table below.

**Table 17: Treatment-emergent hematology laboratory abnormalities in Study MMY3006**

	DVTd (N=536) %			VTd (N=538) %		
	Any Grade	Grade 3	Grade 4	Any Grade	Grade 3	Grade 4
Anemia	36	4	0	35	5	0
Thrombocytopenia	81	9	5	58	8	3
Leukopenia	82	14	10	57	6	9
Neutropenia	63	19	14	41	10	9

Lymphopenia	95	44	15	91	37	10
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Key: D=daratumumab, VTd=bortezomib-thalidomide -dexamethasone.

### **Relapsed/Refractory Multiple Myeloma**

#### ***Combination treatment with lenalidomide and dexamethasone***

Adverse reactions described in the table below reflect exposure to Daratumumab (Darzalex™) for a median treatment duration of 13.1 months (range: 0 to 20.7 months) for the daratumumab-lenalidomide-dexamethasone (DRd) group and median treatment duration of 12.3 months (range: 0.2 to 20.1 months) for the lenalidomide-dexamethasone group (Rd) in a Phase 3 active-controlled study (Study MMY3003). The most frequent adverse reactions were infusion reactions, diarrhea, nausea, fatigue, pyrexia, upper respiratory tract infection, muscle spasms, cough and dyspnea. Serious adverse reactions were pneumonia, upper respiratory tract infection, influenza and pyrexia. Adverse reactions result in discontinuations for 7% (n=19) of patients in the DRd arm versus 8% (n=22) in the Rd arm.

**Table 18: Adverse reactions reported in Study MMY3003\***

System Organ Class Adverse Reaction	DRd (N=283)			Rd (N=281)		
	Any Grade (%)	Grade 3 (%)	Grade 4 (%)	Any Grade (%)	Grade 3 (%)	Grade 4 (%)
Infusion reactions <sup>a</sup>	48	5	0	0	0	0
<b>Gastrointestinal disorders</b>						
Diarrhea	43	5	0	25	3	0
Nausea	24	1	0	14	0	0
Vomiting	17	1	0	5	1	0
<b>General disorders and administration site conditions</b>						
Fatigue	35	6	< 1	28	2	0
Pyrexia	20	2	0	11	1	0
<b>Infections and infestations</b>						
Influenza	7	3	0	5	1	0
Pneumonia <sup>b</sup>	19	10	2	15	7	2
Upper respiratory tract infection <sup>b</sup>	65	6	< 1	51	4	0
<b>Musculoskeletal and connective tissue disorders</b>						
Muscle spasms	26	1	0	19	2	0
<b>Nervous system disorders</b>						
Headache	13	0	0	7	0	0
<b>Respiratory, thoracic and mediastinal disorders</b>						
Cough <sup>b</sup>	30	0	0	15	0	0
Dyspnea	21	3	< 1	12	1	0

Key: D=daratumumab, Rd=lenalidomide-dexamethasone.

<sup>a</sup> Infusion reaction includes terms determined by investigators to be related to infusion, see section on Infusion-related Reactions below

<sup>b</sup> Indicates grouping of preferred terms

\*Note: Adverse reactions that occurred in  $\geq 10\%$  of patients and with at least a 5% frequency greater in the DRd arm are listed. In addition, serious adverse events are listed if there was at least a 2% greater incidence in the DRd arm compared to the Rd arm.

Hematology laboratory related toxicities were excluded and reported separately in the table below

Laboratory abnormalities worsening during treatment from baseline are listed in the table below.

**Table 19: Treatment-emergent hematology laboratory abnormalities**

	Study MMY3003					
	DRd (N=283) %			Rd (N=281) %		
	Any Grade	Grade 3	Grade 4	Any Grade	Grade 3	Grade 4
Anemia	52	13	0	57	19	0
Thrombocytopenia	73	7	6	67	10	5
Neutropenia	92	36	17	87	32	8
Lymphopenia	95	42	10	87	32	6

Key: D=Daratumumab, Rd=lenalidomide-dexamethasone.

### **Combination treatment with bortezomib and dexamethasone**

Adverse reactions described in table below reflect exposure to Daratumumab (Darzalex™) for a median treatment duration of 6.5 months (range: 0 to 14.8 months) for the daratumumab-bortezomib-dexamethasone (DVd) group and median treatment duration of 5.2 months (range: 0.2 to 8.0 months) for bortezomib-dexamethasone group (Vd) in a Phase 3 active-controlled study (Study MMY3004). The most frequent adverse reactions (>20%) were infusion reactions, diarrhea, peripheral edema, upper respiratory tract infection, peripheral sensory neuropathy, cough and dyspnea. Serious adverse reactions included diarrhea, upper respiratory tract infection and atrial fibrillation. Adverse reactions resulted in discontinuations for 7% (n=18) of patients in the DVd arm versus 9% (n=22) in the Vd arm.

**Table 20: Adverse reactions reported in Study MMY3004\***

System Organ Class Adverse Reaction	DVd (N=243)			Vd (N=237)		
	Any Grade (%)	Grade 3 (%)	Grade 4 (%)	Any Grade (%)	Grade 3 (%)	Grade 4 (%)
Infusion reactions <sup>a</sup>	45	9	0	0	0	0
<b>Cardiac disorders</b>						
Atrial fibrillation	5	1	1	2	1	0
<b>Gastrointestinal disorders</b>						
Diarrhea	32	3	< 1	22	1	0
Vomiting	11	0	0	4	0	0
<b>General disorders and administration site conditions</b>						
Edema peripheral <sup>b</sup>	22	1	0	13	0	0
Pyrexia	16	1	0	11	1	0
<b>Infections and infestations</b>						
Upper respiratory tract infection <sup>b</sup>	44	6	0	30	3	< 1
<b>Nervous system disorders</b>						
Peripheral sensory neuropathy	47	5	0	38	6	< 1
<b>Respiratory, thoracic and mediastinal disorders</b>						
Cough <sup>b</sup>	27	0	0	14	0	0
Dyspnea <sup>b</sup>	21	4	0	11	1	0

Key: D=daratumumab, Vd=bortezomib-dexamethasone.

<sup>a</sup> Infusion reaction includes terms determined by investigators to be related to infusion, see section on Infusion-related Reactions below

<sup>b</sup> Indicates grouping of preferred terms

\*Note: Adverse reactions that occurred in ≥ 10% of patients and with at least a 5% frequency greater in the DVd arm are listed. In addition, serious adverse events are listed if there was at least a 2% greater incidence in the DVd arm compared to the Rd arm. Hematology laboratory related toxicities were excluded and reported separately in the table below

Laboratory abnormalities worsening during treatment are listed in the table below.

**Table 21: Treatment-emergent hematology laboratory abnormalities**

	Study MMY3004					
	DVd (N=243) %			Vd (N=237) %		
	Any Grade	Grade 3	Grade 4	Any Grade	Grade 3	Grade 4
Anemia	48	13	0	56	14	0

Thrombocytopenia	90	28	19	85	22	13
Neutropenia	58	12	3	40	5	<1
Lymphopenia	89	41	7	81	24	3

Key: D=Daratumumab, Vd=bortezomib-dexamethasone.

**Adverse Reactions identified from other clinical trials**

Sepsis

**Monotherapy**

The data described below reflect exposure to Daratumumab (Darzalex™) in three pooled open-label clinical studies that included 156 patients with relapsed and refractory multiple myeloma treated with Daratumumab (Darzalex™) at 16 mg/kg. The median duration of Daratumumab (Darzalex™) treatment was 3.3 months, with the longest duration of treatment being 14.2 months. Adverse reactions occurring at a rate of ≥ 10% are presented in the table below. The most frequently reported adverse reactions (≥20%) were IRRs, fatigue, nausea, back pain, anemia, neutropenia and thrombocytopenia. Four percent of patients discontinued Daratumumab (Darzalex™) treatment due to adverse reactions, none of which were considered drug related.

Frequencies are defined as very common (≥1/10), common (≥1/100 to <1/10), uncommon (≥1/1000 to <1/100), rare (≥1/10000 to <1/1000) and very rare (<1/10000).

**Table 22: Adverse reactions in multiple myeloma patients treated with Daratumumab (Darzalex™) 16 mg/kg**

System Organ Class	Adverse Reaction	Frequency (all Grades)	Incidence (%)	
			All Grades	Grade 3-4
Infections and infestations	Upper respiratory tract infection	Very Common	17	1*
	Nasopharyngitis		12	0
	Pneumonia**		10	6*
Blood and lymphatic system disorders	Anemia	Very Common	25	17*
	Neutropenia		22	12
	Thrombocytopenia		20	14
Metabolism and nutrition disorders	Decreased appetite	Very Common	15	1*
Respiratory, thoracic and mediastinal disorders	Cough	Very Common	14	0
Gastrointestinal disorders	Nausea	Very Common	21	0
	Diarrhea		15	0
	Constipation		14	0
Musculoskeletal and connective tissue disorders	Back pain	Very Common	20	2*
	Arthralgia		16	0
	Pain in extremity		15	1*

	Musculoskeletal chest pain		10	1*
<b>General disorders and administration site conditions</b>	Fatigue	Very Common	37	2*
	Pyrexia		17	1*
<b>Injury, poisoning and procedural complications</b>	Infusion-related reaction***	Very Common	51	4*

\* No Grade 4

\*\* Pneumonia also includes the terms pneumonia streptococcal and lobar pneumonia

\*\*\* Infusion-related reactions include but are not limited to, the following multiple adverse reaction terms: nasal congestion, cough, chills, allergic rhinitis, throat irritation, dyspnea, nausea (all  $\geq$  5%), bronchospasm (2.6%), hypertension (1.9%) and hypoxia (1.3%).

### Infusion-related reactions

In clinical trials (monotherapy and combination treatment; N=2066) the incidence of any grade infusion-related reactions was 37% with the first (16 mg/kg, Week 1) infusion of Daratumumab (Darzalex™), 2% with the Week 2 infusion, and cumulatively 6% with subsequent infusions. Less than 1% of patients had a Grade 3/4 infusion reaction at Week 2 or subsequent infusions.

The median time to onset of a reaction was 1.5 hours (range: 0 to 72.8 hours). The incidence of infusion modifications due to reactions was 36%. Median durations of 16 mg/kg infusions for the 1<sup>st</sup>, 2<sup>nd</sup> and subsequent infusions were approximately 7, 4 and 3 hours respectively.

Severe infusion-related reactions included bronchospasms, dyspnea, laryngeal edema, pulmonary edema, hypoxia, and hypertension. Other adverse infusion-related reactions included nasal congestion, cough, chills, throat irritation, vomiting and nausea.

When Daratumumab (Darzalex™) dosing was interrupted in the setting of ASCT (Study MMY3006) for a median of 3.75 (range: 2.4; 6.9) months, upon re-initiation of Daratumumab (Darzalex™) the incidence of IRRs was 11% at first infusion following ASCT. Infusion rate/dilution volume used upon re-initiation was that used for the last Daratumumab (Darzalex™) infusion prior to interruption due to ASCT. IRRs occurring at re-initiation of Daratumumab (Darzalex™) following ASCT were consistent in terms of symptoms and severity (Grade 3/4:<1%) with those reported in previous studies at Week 2 or subsequent infusions.

### Infections

In patients receiving Daratumumab (Darzalex™) combination therapy, Grade 3 or 4 infections were reported as follows:

Relapsed/refractory patient studies: DVd: 21%, Vd: 19%; DRd: 28%, Rd: 23%; DPd: 28%; DKd<sup>a</sup>: 36%, Kd<sup>a</sup>: 27%, DKd<sup>b</sup>: 21%

<sup>a</sup> where carfilzomib 20/56 mg/m<sup>2</sup> was administered twice-weekly

<sup>b</sup> where carfilzomib 20/70 mg/m<sup>2</sup> was administered once-weekly

Newly diagnosed patient studies: D-VMP: 23%, VMP: 15%; DRd: 32%, Rd: 23%; DVTd: 22%, VTd: 20%.

Pneumonia was the most commonly reported severe (Grade 3 or 4) infection across studies. In active controlled studies, discontinuations from treatment due to infections occurred in 1-4% of patients. Fatal infections were primarily due to pneumonia and sepsis.

In patients receiving Daratumumab (Darzalex™) combination therapy, fatal infections (Grade 5) were reported as follows:



Relapsed/refractory patient studies: DVd: 1%, Vd: 2%; DRd: 2%, Rd: 1%; DPd: 2%; DKd<sup>a</sup>: 5%, Kd<sup>a</sup>: 3%; DKd<sup>b</sup>: 0%

<sup>a</sup> where carfilzomib 20/56 mg/m<sup>2</sup> was administered twice-weekly

<sup>b</sup> where carfilzomib 20/70 mg/m<sup>2</sup> was administered once-weekly

Newly diagnosed patient studies: D-VMP:1%, VMP: 1%; DRd: 2%, Rd: 2%; DVTd: 0%, VTd: 0%.

### Other Adverse Reactions

Other adverse reactions reported in patients treated with daratumumab in clinical trials are listed in Table 23.

**Table 23. Other adverse reactions reported in patients treated with daratumumab in clinical trials**

System Organ Class
Adverse Reaction (%)
<b>Infections and Infestations</b>
Cytomegalovirus infection <sup>a</sup> (<1%)
<b>Nervous system disorders</b>
Syncope (3%)
<b>Gastrointestinal disorders</b>
Pancreatitis <sup>b</sup> (1%)
Immune system disorders
Hypogammaglobulinemia <sup>c</sup>

<sup>a</sup> Cytomegalovirus chorioretinitis, Cytomegalovirus colitis, Cytomegalovirus duodenitis, Cytomegalovirus enteritis, Cytomegalovirus enterocolitis, Cytomegalovirus gastritis, Cytomegalovirus gastroenteritis, Cytomegalovirus gastrointestinal infection, Cytomegalovirus hepatitis, Cytomegalovirus infection, Cytomegalovirus mucocutaneous ulcer, Cytomegalovirus myelomeningoradiculitis, Cytomegalovirus myocarditis, Cytomegalovirus esophagitis, Cytomegalovirus pancreatitis, Cytomegalovirus pericarditis, Cytomegalovirus syndrome, Cytomegalovirus urinary tract infection, Cytomegalovirus viremia, Disseminated cytomegalovirus infection, Encephalitis cytomegalovirus, Pneumonia cytomegalovirus.

<sup>b</sup> Pancreatitis, Pancreatitis acute, Pancreatitis chronic, Hyperamylasemia, Obstructive pancreatitis, Lipase increased.

<sup>c</sup> Hypogammaglobulinemia, Blood immunoglobulin G decreased. Immunoglobulins decreased.

### Other special population

Of the 2459 patients who received Daratumumab (Darzalex™) at the recommended dose, 38% were 65 to 75 years of age, and 15% were 75 years of age or older. No overall differences in effectiveness were observed based on age. The incidence of serious adverse reactions was higher in older than in younger patients (see **Adverse Reactions, Clinical Studies**). Among patients with relapsed and refractory multiple myeloma (n=1213), the most common serious adverse reactions that occurred more frequently in elderly (≥65 years of age) were pneumonia and sepsis. Among patients with newly diagnosed multiple myeloma who are ineligible for autologous stem cell transplant (n=710), the most common serious adverse reaction that occurred more frequently in elderly (≥75 years of age) was pneumonia.

### Postmarketing data

Adverse reactions identified during postmarketing experience with Daratumumab are included in Table 24. The frequencies are provided according to the following convention:

Very common	≥1/10
Common	≥1/100 to <1/10
Uncommon	≥1/1000 to <1/100
Rare	≥1/10000 to <1/1000
Very rare	<1/10000, including isolated reports

Not known frequency cannot be estimated from the available data

In Table 24, adverse reactions are presented by frequency category based on spontaneous reporting rates.

**Table 24: Postmarketing Adverse Reactions identified with daratumumab**

System Organ Class Adverse Reaction	Frequency Category based on Spontaneous Reporting Rates
<b>Immune System disorders</b> Anaphylactic reaction	Rare
<b>Infections and Infestations</b> Hepatitis B virus reactivation	Rare

## OVERDOSE

### Symptoms and signs

There has been no experience of overdosage in clinical studies. Doses up to 24 mg/kg have been administered intravenously in a clinical study without reaching the maximum tolerated dose.

### Treatment

There is no known specific antidote for Daratumumab (Darzalex™) overdose. In the event of an overdose, the patient should be monitored for any signs or symptoms of adverse effects and appropriate symptomatic treatment be instituted immediately.

## INCOMPATIBILITIES

This medicinal product must not be mixed with other medicinal products except those mentioned in *Instructions for Use and Handling and Disposal*.

## SHELF-LIFE

### Unopened vials:

See expiry data on the outer pack

### After dilution:

Since daratumumab solutions do not contain a preservative, unless the method of opening/dilution precludes the risk of microbial contamination, the product should be used immediately. If not used immediately, the solution may be stored in a refrigerator protected from light at 2°C-8°C for up to 24 hours prior to use, followed by 15 hours (including infusion time) at room temperature 15°C-25°C and room light.

## INSTRUCTIONS FOR USE AND HANDLING AND DISPOSAL

Prepare the solution for infusion using aseptic technique as follows:

- Calculate the dose (mg), total volume (mL) of Daratumumab (Darzalex™) solution required and the number of Daratumumab (Darzalex™) vials needed based on patient weight.
- Check that the Daratumumab (Darzalex™) solution is colorless to yellow. Do not use if opaque particles, discoloration or other foreign particles are present.
- Using aseptic technique, remove a volume of 0.9% Sodium Chloride from the infusion bag/container that is equal to the required volume of Daratumumab (Darzalex™) solution.
- Withdraw the necessary amount of Daratumumab (Darzalex™) solution and dilute to the appropriate volume by adding to an infusion bag/container containing 0.9% Sodium Chloride (see *Dosage and Method of Administration*). Infusion bags/containers must be made of polyvinylchloride

(PVC), polypropylene (PP), polyethylene (PE) or polyolefin blend (PP+PE). Dilute under appropriate aseptic conditions. Discard any unused portion left in the vial.

- Gently invert the bag/container to mix the solution. Do not shake or freeze.
- Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit. The diluted solution may develop very small, translucent to white proteinaceous particles, as daratumumab is a protein. Do not use if visibly opaque particles, discoloration or foreign particles are observed.
- Since Daratumumab (Darzalex™) does not contain a preservative, diluted solutions should be administered within 15 hours (including infusion time) at room temperature 15°C–25°C and in room light.
- If not used immediately, the diluted solution can be stored prior to administration for up to 24 hours at refrigerated conditions 2°C–8°C and protected from light. Do not freeze.
- Administer the diluted solution by intravenous infusion using an infusion set fitted with a flow regulator and with an in-line, sterile, non-pyrogenic, low protein-binding polyethersulfone (PES) filter (pore size 0.22 or 0.2 micrometer). Polyurethane (PU), polybutadiene (PBD), PVC, PP or PE administration sets must be used.
- Do not infuse Daratumumab (Darzalex™) concomitantly in the same intravenous line with other agents.
- Do not store any unused portion of the infusion solution for reuse. Any unused product or waste material should be disposed of in accordance with local requirements.

#### **CAUTION**

Foods, Drugs, Devices and Cosmetics Act prohibits dispensing without prescription.

Patient must seek medical attention immediately at the first sign of any adverse drug reaction. For suspected adverse drug reaction, report to the FDA: [www.fda.gov.ph](http://www.fda.gov.ph).

Questions or comments? Email us at [Janssendrugsafety\\_Phil@its.jnj.com](mailto:Janssendrugsafety_Phil@its.jnj.com).

#### **AVAILABILITY**

Type I glass vial with an elastomeric closure and aluminum seal with a flip-off cap x 5 mL, 20 mL (Box of 1's)

#### **STORAGE CONDITIONS**

Store at temperatures between 2-8°C.

Do not freeze.

Protect from light.

Keep out of the sight and reach of children.

Keep the vial in the outer carton box in order to protect from light.

For storage conditions of the diluted medicinal product, see *Shelf-life*.

#### **MANUFACTURED BY**

Vetter Pharma Fertigung GmbH & Co. KG  
Mooswiesen 2, Ravensburg  
Germany

#### **PACKED BY**

Cilag AG  
Hochstrasse 201  
Schaffhausen  
Switzerland

**IMPORTED BY**

**Johnson & Johnson**  
(Philippines), Inc.

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