Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in La Oroya Antigua - 2004

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			7684	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			9,0	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,400	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**16,4**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**14,7**	**#¡DIV/0!**
$PbB_{fetal,\ 0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**26,5**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**86,1%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,\ 0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,\ 0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in La Oroya Antigua - 2007

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			2627	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			7,2	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,400	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**9,7**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**8,7**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**15,8**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**35,4%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in La Oroya Antigua - 2011

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			1595	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			5,4	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,400	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**6,9**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**6,2**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**11,2**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**9,4%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in La Oroya Nueva - 2004

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			2159	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			9,0	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,69	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**11,6**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**10,5**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**18,9**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**55,1%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

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Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			863,6	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			7,2	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,690	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**8,3**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**7,4**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**13,4**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**20,3%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in La Oroya Nueva - 2011

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			431,8	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			5,4	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,690	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**5,9**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**5,3**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**9,6**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**3,9%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in Marcavalle - 2004

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			2153	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			9,0	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,52	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**11,3**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**10,2**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**18,3**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**51,8%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in Marcavalle - 2007

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			861,2	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			7,2	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,520	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**8,1**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**7,3**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**13,2**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**19,0%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in Marcavalle - 2011

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			430,6	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			5,4	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,520	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**5,9**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**5,3**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**9,5**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**3,7%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in Chucchis - 2004

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			2371	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			9,0	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,423	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**11,3**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**10,2**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**18,4**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**52,1%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in Chucchis - 2007

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			1186	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			7,2	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,423	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**8,4**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**7,5**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**13,6**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**21,3%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs)-for Female Adults in Chucchis - 2011

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Community Dust Arithmetic Mean Concentration	ug/g or ppm			1020	
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--			0,9	
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day			0,375	
GSD_i	X	X	Geometric standard deviation PbB	--			1,43	
PbB_0	X	X	Baseline PbB	ug/dL			5,4	
IR_S	X		Outdoor dust ingestion rate (including soil-derived indoor dust)	g/day			--	
IR_{S+D}		X	Total ingestion rate of outdoor dust and indoor dust	g/day			0,050	
W_S		X	Weighting factor; fraction of IR_{OD+ID} ingested as outdoor dust	--			0,4	
K_{SD}		X	Mass fraction of outdoor dust in indoor dust	--			0,423	
$AF_{S,D}$	X	X	Absorption fraction (same for CD and RD)	--			0,080	
$EF_{S,D}$	X	X	Exposure frequency (same for CD and RD)	days/yr			365	
$AT_{S,D}$	X	X	Averaging time (same for CD and RD)	days/yr			365	
PbB_{adult}	**PbB of female adults, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**6,4**	**#¡DIV/0!**
PbBfetus	**PbB of fetus, geometric mean**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**5,8**	**#¡DIV/0!**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adults**			**ug/dL**	**#¡DIV/0!**	**#¡DIV/0!**	**10,4**	**#¡DIV/0!**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10,0**	**10,0**	**10,0**	**10,0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**#¡DIV/0!**	**#¡DIV/0!**	**6,2%**	**#¡DIV/0!**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Defaults (DO NOT CHANGE THESE!!)

PRG for Lead

Values for Non-Residential Exposure Scenario			
Using Equation 1		Using Equation 2	
GSDi = Hom	GSDi = Het	GSDi = Hom	GSDi = Het
10	10	10	10
0,9	0,9	0,9	0,9
0,4	0,4	0,4	0,4
2,1	2,3	2,1	2,3
1,5	1,7	1,5	1,7
0,050	0,050	--	--
--	--	0,050	0,050
--	--	1,0	1,0
--	--	0,7	0,7
0,12	0,12	0,12	0,12
219	219	219	219
365	365	365	365
1.235	**780**	**1.235**	**780**

PbB Calculation

Values for Non-Residential Exposure Scenario			
Using Equation 1		Using Equation 2	
GSDi = Hom	GSDi = Het	GSDi = Hom	GSDi = Het
750	750	750	750
0,9	0,9	0,9	0,9
0,4	0,4	0,4	0,4
2,1	2,3	2,1	2,3
1,5	1,7	1,5	1,7
0,050	0,050	--	--
--	--	0,050	0,050
--	--	1,0	1,0
--	--	0,7	0,7
0,12	0,12	0,12	0,12
219	219	219	219
365	365	365	365
2,6	**2,8**	**2,6**	**2,8**
7,9	**9,8**	**7,9**	**9,8**
10,0	**10,0**	**10,0**	**10,0**
2,5%	**4,8%**	**2,5%**	**4,8%**