ᐊᑑᑎᔭᐅᒍᓐᓇᑐᑦ ᐊᓪᓚᕐᑯᑏᑦ ᐅᓐᓂᑑᑎᖃᕐᓂᒧᑦ ᐃᓗᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᒥ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᖓᓂ ᐃᓱᒪᒋᑦᓱᒋᑦ ᓄᑕᐅᓯᓕᕐᓯᒪᔪᑦ ᐅᓄᕐᓂᖏᑦᑕ ᐃᒣᓪᓗᐊᕐᑰᕐᒪᑖᕐᑕᐅᒍᑎᖏᓐᓂ 2021-ᒥᓂᑦ ᖃᖓᑦᑕᔫᑯᑦ ᖃᐅᔨᓴᕐᓂᒥ

ᐊᑐᐃᓐᓇᕈᕐᑎᑕᐅᓯᒪᔪᑦ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᖓᓂᒥᐅᑦ ᐊᔪᕿᒋᐊᕐᑎᖏᑦᑕ ᑲᑎᒪᔨᖏᓐᓄᑦ

ᐊᑐᐃᓐᓇᕈᕐᑎᑕᐅᔪᑦ ᐅᑯᓄᖓ: ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᖓᓂᒥᐅᑦ ᐱᓪᓗᑯᒋᐊᓕᓕᕆᔨᑦ ᐱᓇᓱᖃᑎᒌᑦᑎᖏᑦᑕ[1] ᐊᒻᒪᓗ E.V. Regehr[2]

ᖃᖓᓂᑕᐅᓂᖏᑦᑕ ᐅᓪᓗᖓ: ᐊᐅᒡᒍᓯ 25, 2023

ᑕᒪᓐᓇ ᐊᑑᑎᔭᐅᒍᓐᓇᑐᑦ ᐊᓪᓚᕐᑯᑎᖓ ᐃᓚᒋᐊᕈᑎᐅᕗᖅ ᐅᕗᖓ Regehr, E., M. Dyck, G. Gilbert, S. Iverson, D. Lee, N. Lunn, J. Northrup, A. Penn, M.-C. Richer and G. Szor. 2019. ᐃᒻᒪᖃᐅᑎᖃᕈᑎ ᐆᒪᔪᕐᓂᐊᓂᕐᒥ ᐊᑦᑕᓇᑐᐃᓐᓇᕆᐊᓕᓐᓂᒃ ᖃᐅᔨᓴᕐᓂᖅ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᖓᓂᒥᐅᓂᒃ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᖓᓂᒃ. ᑐᓴᕐᑎᓯᒍᑏᑦ ᑕᓯᐅᔭᕐᔪᐊᒥᐅᑦ ᓯᕿᓂᖓᓂᒥᑦ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᖓᓄᓕᖓᔪᓄᑦ ᐊᔪᕿᒋᐊᕐᑏᑦ ᑲᑎᒪᔨᖏᓐᓂᒃ, ᔫᓂ 7, 2019-ᒥ. ᑭᓇᓕᒫᒃᑯᓄᑦ ᐊᑐᐃᓐᓇᕈᓚᐅᕐᓯᒪᖕᖏᑐᑦ. 75 pp.

[1]ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ ᐱᓪᓗᑯᒋᐊᓕᓕᕆᔨᑦ ᐱᓇᓱᖃᑎᒌᑦᑎᖏᑦ: Mark Basterfield (ᓄᓇᕕᒻᒥ ᐃᒪᕐᒥᐅᑕᓂ ᓂᕐᔪᑎᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᑦ); Alyssa Bohart (ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᕕᖓ); Félix Boulanger (ᐊᓪᓕᑦ ᐃᒪᕐᒥᐅᑕᓂ ᓂᕐᔪᑎᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᑦ); Aurélie Bourbeau-Lemieux (ᑯᐯᒻᒥ ᑐᕐᖃᑕᕐᕕᒃ ᐊᕙᑎᓕᕆᓂᕐᒥ, ᓯᓚᐅᑉ ᐊᓯᑦᔨᐸᓪᓕᐊᓂᖓᓄᑦ ᖃᓄᐃᓕᕆᐊᕐᑏᑦ, ᓂᕐᔪᑎᓕᕆᓂᕐᓂ ᐊᒻᒪᓗ ᒥᕐᖑᐃᓯᕐᕕᓂ); Melissa Galicia (ᐅᑦᓯᑯᕐᑎᓯᔨ; ᐊᕙᑎᓕᕆᓂᕐᒥ ᐊᒻᒪᓗ ᓯᓚᐅᑉ ᐊᓯᑦᔨᐸᓪᓕᐊᓂᖓᓂ ᑲᓇᑕᒥ); Ezra Greene (ᓄᓇᕗᑦ ᑐᖕᖓᕕᒃᑯᑦ ᐱᓇᓱᕝᕕᖓ); Rachel Guindon (ᒪᑭᕝᕕᒃ); Michael Ferguson (ᕿᑭᕐᑖᓗᒻᒥ ᓂᕐᔪᑎᓕᕆᓂᕐᒥ ᑲᑎᒪᔨᑦ); Barrie Ford (ᒪᑭᕝᕕᒃ); Nick Lunn (ᐊᕙᑎᓕᕆᓂᕐᒥ ᐊᒻᒪᓗ ᓯᓚᐅᑉ ᐊᓯᑦᔨᐸᓪᓕᐊᓂᖓᓂ ᑲᓇᑕᒥ); Joseph Northrup (ᐋᓐᑎᐊᐱᕆᐅᒥ ᐊᕙᑎᓕᕆᓂᕐᒥ ᑐᕐᖃᑕᕐᕕᒃ, ᓄᖑᐃᓐᓇᑎᑦᓯᒐᓕᓂᕐᒥ ᒥᕐᖑᐃᓯᕐᕕᓂᓪᓗ ᐊᒻᒪᓗ ᑐᕐᖃᑕᕐᕕᒃ ᓄᓇᒥᑦ ᐱᓯᒪᔪᓂᒃ ᐱᑦᓴᑖᕐᕕᓕᕆᓂᕐᒥ ᓇᐹᕐᑐᓕᕆᓂᕐᒥᓗ); Alan Penn (ᐊᓪᓕᑦ ᑲᕙᒪᖓ); Kyle Ritchie (ᓄᓇᕗᑦ ᓂᕐᔪᑎᓕᕆᓂᕐᒥ ᐊᐅᓚᑦᓯᓂᓕᕆᓂᕐᒧᑦ ᑲᑎᒪᔨᑦ); Miles Smart (ᒪᕐᕿᓐᓂᖅ, ᐃᖃᓪᓕᐊᓂᖅ ᒥᑭᒋᐊᓐᓂᐊᓂᕐᓗ ᐊᐅᓚᕐᓯᓂᓕᕆᓂᕐᒧᑦ ᑲᑎᒪᔨᑦ); Guillaume Szor (ᑯᐯᒻᒥ ᑐᕐᖃᑕᕐᕕᒃ ᐊᕙᑎᓕᕆᓂᕐᒥ, ᓯᓚᐅᑉ ᐊᓯᑦᔨᐸᓪᓕᐊᓂᖓᓄᑦ ᖃᓄᐃᓕᕆᐊᕐᑏᑦ, ᓂᕐᔪᑎᓕᕆᓂᕐᓂ ᐊᒻᒪᓗ ᒥᕐᖑᐃᓯᕐᕕᓂ)

[2] ᐅᑭᐅᕐᑕᑐᒥ ᓱᑯᐃᔪᓂᓕᕆᕕᒃ, ᐃᓕᓐᓂᐊᕕᕐᔪᐊᖓ Washington

ᓱᓇᑕᖃᕐᓂᖏᑦ

ᓱᓇᓕᑦᑖᓂᖏᑦ ᖃᓄᐃᑦᑐᑰᕐᓯᒪᓂᖏᓪᓗ 3
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ᐱᑕᖃᕐᓂᒥ ᐃᒣᓪᓗᐊᕐᑰᕐᒪᑖᕈᑏᑦ 6
ᐅᓐᓂᑑᑕᐅᒍᓐᓇᓂᖏᑦ 8
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ᓯᓇᓕᑦᑖᓂᖏᑦ ᖃᓄᐃᑦᑐᑰᕐᓯᒪᓂᖏᓪᓗ

ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᖓᓂᒃ ᐃᓂᖃᕐᕕᓖᑦ ᐊᒥᕐᖃᖃᑎᒌᒍᑕᐅᓲᖑᕗᑦ ᐊᒥᓱᓄᑦ ᑲᕙᒪᓐᓄᑦ, ᓂᕐᔪᑎᓕᕆᓂᕐᒥ ᐊᐅᓚᑦᓯᓂᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ, ᓄᓇᒥᓪᓗ ᐊᖏᖃᑎᒌᒍᑎᖃᕐᓂᑯᑦ ᐱᓇᓱᕝᕕᐅᔪᓄᑦ. ᑕᒪᓐᓇ ᐊᖏᔫᓂᖓ ᐱᑦᔪᑎᒋᑦᓱᒍ, ᐊᑕᐅᑦᓯᑯᕐᑎᑕᐅᓂᖃᕆᐊᖃᕐᐳᑦ ᑐᑭᑖᕈᑎᖃᕐᓂᒥ ᒪᕿᓐᓂᓂ ᑲᑎᕐᓱᓱᒪᔫᑯᓗ ᑐᓴᐅᒪᔭᐅᒋᐊᓕᓐᓂᒃ. ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ ᐱᓇᓱᖃᑎᒌᑦᑎᖏᑦ (TWG) ᓄᐃᑕᐅᓯᒪᔪᑦ ᓴᐳᕐᔨᓂᕐᒧᑦ ᐊᐅᓚᑦᓯᓂᓕᕆᓂᕐᒥ ᐅᓐᓂᑑᑎᖃᕐᓂᓄᑦ ᑐᑭᑖᕈᑎᖃᕐᓂᓄᓪᓗ ᐊᐅᓚᑦᓯᓂᒃᑯᑦ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᓂᒃ, ᑐᑭᓯᓴᕐᓂᓂᒃ ᓄᐃᑕᐅᓯᒪᔪᓂᓪᓗ ᑐᓴᐅᒪᔭᐅᒋᐊᓕᑦᑕᓖᑦ, ᖃᓄᐃᑦᑑᓂᖏᓐᓂᓗ ᑐᓴᕐᑎᓯᒍᑎᖃᕐᓂᖅ ᐊᔪᕿᒋᐊᕐᑏᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ.

ᑐᙵᕕᖏᑦ 2019-ᒥ ᑕᓯᐅᔭᕐᔪᐊᒥᐅᑦ ᐊᑦᑕᓇᕐᑐᒦᑐᐃᓐᓇᕆᐊᖃᕐᓂᖏᓐᓄᑦ ᖃᐅᔨᓴᕐᓂᖅ

2019-ᒥ, Dr. Eric Regehr (ᐅᑭᐅᕐᑕᑐᒥ ᓱᑯᐃᔪᓂᓕᕆᕕᒃ, ᐃᓕᓐᓂᐊᕕᕐᔪᐊᖓ Washington), ᐱᓇᓱᖃᑎᒋᑦᓱᒋᑦ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ ᐱᓇᓱᖃᑎᒌᑦᑎᖏᑦ ᐱᓇᓱᓚᐅᔪᑦ ᒪᕿᓐᓂᑯᑦ ᖃᐅᔨᓴᕐᓱᑎᒃ ᐊᑦᑕᓇᕐᑐᒦᑐᐃᓐᓇᕆᐊᓕᓐᓂᒃ ᐊᑐᐃᓐᓇᕈᕐᑎᓱᑎᓗ ᑐᓴᕐᑎᓯᒍᑎᑦᓴᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ ᐊᔪᕿᒋᐊᕐᑏᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ (UL, 2019-ᒥ ᐊᑦᑕᓇᕐᑐᒦᑐᐃᓐᓇᕆᐊᓖᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᖓ). 2021-ᒥ, ᐱᓇᓱᖃᑎᒌᑦ ᕿᒥᕐᕈᓯᒪᔭᖏᑦ ᐊᓪᓚᕕᑦᓴᓃᑦᑐᑦ ᑭᓇᓕᒫᒃᑯᓄᑦ ᐊᑐᐃᓐᓇᕈᕐᓯᒪᔪᑦ ᑐᙵᕕᖃᕐᓱᑎᒃ ᓄᐃᑕᐅᔪᕕᓂᕐᓂᒃ 2019-ᒥ ᐊᑦᑕᓇᕐᑐᒦᑐᐃᓐᓇᕆᐊᓖᑦ ᖃᐅᔨᓴᕐᑕᐅᒍᑎᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐃᓂᖃᕐᕕᓕᓐᓂᒃ (ᑕᑯᒋᐊᕐᓗᒋᑦ Regehr et al. 2021). ᐃᓱᒪᒋᐅᕐᔨᔭᐅᓯᒪᔪᑦ ᐅᓄᕐᓂᖏᑦ ᒪᕿᓐᓃᓗ ᖃᓇᑕᐅᔭᒧᑦ ᑐᕐᕐᑯᑐᕐᑕᐅᓯᒪᔪᑦ 2016-ᒥ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᓂ (Obbard et al. 2018). ᖃᐅᔨᒪᓇᕐᑎᓇᒍ ᓱᒪᓗᓐᓂᖓ ᖃᓄᐃᓪᓗᐊᒪᖔᑦ ᓯᕗᓂᕐᒥ ᓯᓚᐅᑉ ᐊᓯᑦᔨᑉᓪᓕᐊᓂᖓᑕ ᖃᓄᐃᑦᑑᓂᖃᕐᓂᖓ ᑕᑯᓐᓇᕈᓯᖃᑎᒌᖕᖏᓂᕐᓗ ᓱᕐᖑᓯᒪᓂᖏᓐᓂᒃ ᓇᓄᐃᑦ ᐅᓄᕐᓂᖏᓐᓂᒃ, ᐊᓪᓚᓯᒪᔪᓕᐅᕐᑏᑦ ᓇᓗᓂᕐᓯᓚᐅᔪᑦ ᐱᖓᓱᐃᓂᒃ ᖃᓄᐃᑦᑑᓂᐅᒐᔭᖕᖑᐊᑐᓂᒃ ᒫᓐᓇᒧᓕᖓᔪᓄᑦ ᓯᕗᓂᕐᒥᓗ ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑐᓄᑦ ᐊᐅᓚᓂᖓᓄᑦ ᐊᕙᑎᐅᑉ ᖃᓄᐃᑦᑑᓂᖏᑦᑕ.

- ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᓱᓂ 1 ᐃᓱᒪᒋᐅᕐᔨᓯᒪᔪᖅ ᖃᓄᐃᑦᑑᓂᕆᒐᔭᕐᑕᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂᒥᐅᑦ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᖓᓂᒃ ᐊᕐᕌᒍᓛᕐᑐᓂ 34-ᓂ (ᐆᑦᑑᑎᒋᓗᒍ, ᐱᖓᓱᑦ ᓇᓄᐃᑦ ᑭᖑᕙᓈᑦ) ᒐᒥᑦᑐᓴᓐᓇᒐᓚᐅᓛᕐᔭᕐᑐᑦ 1986-2016 ᐊᕐᕌᒍᖏᑦᑕ ᖃᓄᐃᑦᑑᓂᕕᓂᖏᓐᓄᑦ, ᒐᑲᓂ ᐅᓄᕐᓂᖏᑦ ᕿᑐᕐᖏᐅᕈᓐᓇᓯᐊᕐᑐᕕᓃᑦ (ᐅᓄᕐᓂᐸᐅᑎᓪᓗᒋᑦ ᐊᒥᓱᖕᖏᕙᓪᓕᐊᓂᖏᑦ [rmax] = 0.08) ᓴᐳᕐᔨᓱᑎᓗ ᐃᓗᓐᓈᒍᑦ ᐱᔭᐅᕕᖕᖓᖃᑦᑕᓂᕐᒥᓄᑦ. ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑐᖅ 1 ᓂᑦᑕᑎᑦᓯᕗᖅ ᐃᑭᓪᓕᕙᓪᓕᐊᓂᖏᓐᓂᒃ ᐊᕙᑎᐅᑉ ᓇᔪᕐᑕᐅᕈᓐᓇᓂᖏᑦᑕ (K) 3%-ᓄᑦ ᐊᕐᕋᒍᐃᑦ ᕐᑯᓕᑕᒫᑦ ᑲᔪᓯᑦᓱᑎᓗ, ᑐᓴᕐᑎᑕᐅᓯᒪᑦᓱᑎᒃ ᐃᑉᐱᒋᔭᐅᓯᒪᔪᓄᑦ ᐊᓯᑦᔨᑉᓪᓕᐊᓂᕐᓄᑦ ᓯᑯᐃᑦ ᐱᑕᖃᕐᓂᖏᓐᓂ 1980-ᒥᑦ 2016-ᒧᑦ.
- ᕿᑎᖓᓂ ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑐᖅ 2 ᐅᓄᕐᓂᖏᑦ ᖃᓄᐃᑦᑑᓂᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ ᐊᕐᕌᒍᖃᑦᑕᓚᖓᔪᓂ 34-ᓂ ᒐᒥᑦᑐᓴᓐᓇᒐᓚᐅᓚᖓᕗᖅ 2005-2016 ᐊᕐᕌᒍᖏᓐᓄᑦ, ᐃᓂᓖᑦ ᑭᖑᐹᓕᐅᖃᑦᑕᕈᓐᓇᒐᓚᑦᑎᓗᒋᑦ (rmax = 0.05, ᐊᑦᔨᖃᑲᓴᑦᑐᑦ rmax = 0.06 ᐃᓗᓯᕐᓱᓱᐊᕐᑑᑎᓪᓗᒋᑦ ᑕᑯᓐᓇᑕᐅᓂᖓᓱᑦ ᐅᓄᕐᓂᖏᑦ ᓯᓚᐅᑉ ᖃᓄᐃᑦᑑᓂᖓ ᓱᕐᖑᓂᖃᕐᑎᓇᒍ) ᐆᒪᔪᕐᑕᐅᓂᖏᑦ ᓈᒻᒪᑑᑎᓪᓗᒋᑦ. ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑐᖅ 2 ᓂᑦᑕᑎᑦᓯᕗᖅ ᐃᑭᓪᓕᕙᓪᓕᐊᓂᕐᒥᒃ K-ᒥ rmax-ᖓᓗ 3%-ᒦᑦᓱᓂ ᐊᕐᕋᒍᐃᑦ ᕐᑯᓕᑕᒫᑦ ᑲᔪᓯᔪᒥᓪᓗ, ᑐᓴᕐᑎᓯᒍᑕᐅᓯᒪᔪᓄᑦ ᐃᑉᐱᒋᔭᐅᓯᒪᔪᓄᑦ ᓯᑯᐃᑦ ᐱᑕᖃᕐᓂᖏᓐᓄᑦ.
- ᓂᕆᐅᕐᓂᖃᑦᓯᐊᓇᖕᖏᑐᖅ ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑐᖅ 3a ᐊᒻᒪᓗ 3b ᐅᓄᕐᓂᖏᑦᑕ ᖃᓄᐃᑦᑑᓂᖏᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᓖᑦ ᖃᓄᐃᑦᑑᓂᖏᓐᓂᒃ ᐊᕐᕋᒍᓂ 34-ᖑᓚᖓᔪᓂ ᒐᒥᑦᑐᓴᓐᓇᒐᓚᐅᓚᖓᕗᖅ 2012-2016-ᓄᑦ ᐊᕐᕋᒍᓄᑦ. ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑐᖅ 3a ᓂᑦᑕᑎᑦᓯᕗᖅ ᕿᑐᕐᖏᐅᓯᐊᖕᖏᓂᖏᓐᓂᒃ ᐃᑭᓪᓕᕙᓪᓕᐊᓱᑎᓗ ᑕᒪᖏᓐᓂ K-ᒥ rmax-ᓗ 3% ᐊᕐᕋᒍᐃᑦ ᕐᑯᓕᑕᒫᑦ ᑲᔪᓯᔪᒥᓪᓗ, ᓴᕐᕿᑎᑦᓯᓱᒪᑦᓱᑎᒃ ᐊᕙᑎᐅᑉ ᐱᑦᔪᑕᐅᓂᖓᓂᒃ ᓇᔪᕋᑦᓴᐅᓯᐊᖕᖏᓂᖓᓄᑦ ᐃᒻᒥᒨᕐᑐᑯᑦ ᓱᕐᖑᓯᒪᑎᓪᓗᒋᑦ. ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑐᖅ 3b ᕿᑐᕐᖏᐅᕈᓐᓇᓯᐊᕐᓂᖏᓐᓂᒃ ᓂᑦᑕᑎᑦᓯᕗᖅ ᐃᑭᓪᓕᕙᓪᓕᐊᒐᓚᑦᑎᓗᒋᑦ rmax-ᒥ 3% ᐊᕐᕋᒍᐃᑦ ᕐᑯᓕᑕᒫᑦ ᐊᒻᒪᓗ ᐃᑭᓪᓕᐅᒥᑎᓪᓗᒋᑦ K-ᒥ 26% ᐊᕐᕋᒍᐃᑦ ᕐᑯᓕᑕᒫᑦ ᑲᔪᓯᔪᒥᓪᓗ, ᓴᕐᕿᑎᑦᓯᓱᒪᑦᓱᑎᒃ ᐊᕙᑎᐅᑉ ᐱᑦᔪᑕᐅᓂᖓᓂᒃ ᓇᔪᕋᑦᓴᐅᓯᐊᖕᖏᓂᖓᓄᑦ ᐃᒻᒥᒨᕐᑐᑯᑦ ᓱᕐᖑᓯᒪᑎᓪᓗᒋᑦ.

TWG ᐅᓐᓂᑑᑎᓕᒃ ᓱᕐᕐᑯᐃᓯᒍᓐᓇᓂᕐᒧᑦ ᐃᓗᓐᓈᒍᑦ ᒪᕿᓐᓂᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᓂᒃ ᓇᓄᕐᓂᒃ, ᐊᐅᓚᑦᓯᔨᑦ ᐃᑉᐱᒋᔭᖃᕈᓐᓇᑐᑦ ᖃᓄᐃᑦᑐᒦᓐᓂᐅᒐᔭᕐᑐᖅ 2-ᒥᒃ "ᓈᒻᒪᑐᒦᑦᑎᓗᒍ" ᐊᑦᑕᓇᕐᑐᒦᑐᐃᓐᓇᕆᐊᓖᑦ ᑲᒪᒋᔭᐅᓂᖏᓐᓂᒃ, ᑐᑭᓯᓐᓇᑎᑕᐅᑦᓯᑎᒃ ᐆᒪᔪᕐᓂᒥᒃ 80%-ᖏᑦ ᐆᒪᔪᕐᓂᑦ ᐃᑭᓪᓕᐅᒥᑎᑦᓯᓂᐊᕐᑎᓇᒋᑦ ᐅᓄᕐᓂᖏᓐᓂᒃ ᕿᑐᕐᖏᐅᕈᓐᓇᕕᓕᒫᖏᓐᓄᑦ ᐃᑭᓐᓂᓴᕈᕐᑎᓗᒋᑦ (ᐆᑦᑑᑎᒋᓗᒍ ᓇᓄᐃᑦ ᐅᓄᕐᓂᖏᑦᑕ ᐱᑕᖃᕐᓂᖏᑦ ᐱᒍᓐᓇᕕᓕᒫᕐᒥᒍᑦ ᐃᓂᖃᓱᑦ). ᑕᒪᓐᓇ ᐊᕐᓇᖏᓐᓂᒃ

ᐱᔭᐅᓲᖑᓂᖓᔪᖅ ᐊᕐᕌᒍᑕᒫᑦ ᐅᓄᕐᓂᓕᓐᓂᒃ (h) 0.02-0.03 ᐊᕐᓐᑦ ᐱᑕᖃᕐᓂᖏᑦ. ᐊᑐᕐᓱᑦ ᐊᕐᓐᑦ ᐱᔭᐅᓲᖏᓂᖏᑦᑕ ᐅᓄᕐᓂᖏᑦ 0.02-0.03 ᑲᑎᓕᕋᒥᓪᓗ ᖃᑦᓯᐅᓂᐊᖕᖑᒋᔭᐅᓂᖏᑦ (ᐊᕐᓐᑦ ᐊᖑᑏᓪᓗ) ᐱᑕᖃᕐᓂᖏᑦ 781 ᓇᓄᐃᑦ 2016-ᒥᓂᑦ (Obbard et al. 2018), ᑕᒪᓐᓇ ᐱᑐᑦᑐᖅ ᐆᒪᔪᑦᑕᐅᔪᑦ ᑲᑎᓕᕋᒥᑦ 16-23 ᓇᓄᐃᑦ ᐊᕐᕌᒍᑕᒫᑦ ᐊᖑᑏᑦ ᐊᕐᓇᓄᑦ 1:1, ᑲᑎᓕᕋᒥᓪᓘᓃᑦ 23-35 ᐊᖑᑏᑦ ᐊᕐᓇᓄᑦ 2:1 ᓇᓐᓄᑕᐅᔪᑦ ᐅᓄᕐᓂᖏᑦ.

ᕿᒥᕐᕈᑎᓂᖅ 2021-ᒥ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᕕᓂᕐᓂᒃ, ᖃᐅᔨᒪᓇᖕᖏᓂᖏᓪᓗ

ᐊᐅᒡᒍᓱ 2021-ᖑᑎᓪᓗᒍ, ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᓖᑦ ᖃᐅᔨᓴᕐᑕᐅᓯᒪᔪᑦ ᐊᑦᔨᖃᒐᓚᓐᓂᕐᑦᑕᐅᓯᒪᕗᑦ 2011/12-ᒧᑦ 2016-ᒧᓪᓗ. ᑕᒪᓐᓇ ᖃᐅᔨᓴᕐᓂᖅ ᐱᑦᔪᑎᖃᕐᓯᒪᔪᖅ ᐱᑕᖃᓇᐊᓪᓚᓂᕐᒧᑦ, ᓇᓪᓕᒃᑭᑕᐅᒍᓐᓇᑐᓄᑦ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ ᐱᑕᖃᕐᓂᖏᓐᓂ ᖃᐅᔨᓴᕐᓂᒧᑦ ᖃᓄᐃᑦᑑᓂᖏᓐᓄᑦ ᐃᓂᖃᕐᕕᖃᓲᑦ. ᓄᐃᑕᐅᔪᑦ ᑕᕝᕙᓂ ᖃᐅᔨᓴᕐᓂᒥ ᓄᐃᑕᐅᕗᑦ ᑐᑭᓯᓇᐅᑎᓂ Northrup et al.-ᒧᑦ (2022), ᐃᓚᖏᑦ ᐃᓗᓕᖏᑦ ᑐᓴᕐᑎᓯᒍᑎᓂ ᓴᕐᕿᑎᑕᐅᒻᒥᔪᑦ ᐊᑖᓂ ᖃᐅᔨᓴᕐᓂᒎᓕᖓᒻᒪᑕ ᐱᑦᓴᑖᕐᕕᐅᒋᐊᓪᓚᕈᓐᓇᑐᓄᑦ ᐆᒪᔪᕐᓂᐅᓂᕐᒥ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ. ᖃᐅᔨᓴᕐᓂᐅᑉ ᐋᕐᕿᓯᒪᐅᑎᖓ ᐊᑦᔨᖃᕋᓗᐊᕐᑎᓗᒍ ᖃᐅᔨᓴᐅᑎᕕᓂᕐᓄᑦ ᓯᕗᓪᓕᒥ, Northrup et al. (2022) ᐊᑑᑎᖃᓚᐅᔪᖅ ᖃᒻᒥᑯᑦ ᐊᑑᑎᔭᐅᓲᓂᒃ ᑭᓯᑕᐅᒪᐅᑎᓂ ᒥᑦᓴᒍᓐᓂᓴᕐᓂᒃ ᐃᒥᓪᓗᐊᕐᑰᒻᒪᑖᒍᑎᓂ ᓇᓄᐃᑦ ᐱᑕᖃᕐᓂᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ. ᑕᒪᓐᓇ ᓄᐃᑦᓯᓚᕿᓚᐅᔪᖅ ᐱᐅᓂᕐᐹᑯᑦ ᐃᒥᓪᓗᐊᕐᑰᒻᒪᑖᕈᑎᓂᒃ ᓇᓄᐃᑦ ᐅᓄᕐᓂᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐃᓂᖃᕐᕕᖃᓲᓂ ᖃᐅᔨᓴᕐᑕᐅᓯᑎᒃ 2021-ᒥ 1119 ᓇᓄᐃᑦ (95% CI 860-1454). ᐃᒥᖓᓗᐊᕐᑎᓗᒍ, ᑕᒪᓐᓇ ᐃᒥᓪᓗᐊᕐᑰᒻᒪᑖᕈᑎ ᓇᓪᓕᒃᑭᕈᑎᐅᕈᓐᓇᓚᐅᔪᖕᖏᑐᖅ 2016-ᒥ ᖃᐅᔨᓴᕐᓂᒧᑦ ᐊᑦᔨᒌᖕᖏᓂᖏᓐᓄᑦ ᑭᓯᑕᐅᒪᐅᑏᑦ ᖃᐅᔨᓴᕐᑕᐅᒍᑎᖏᑦ. ᐃᒥᓪᓗᐊᕐᑰᒻᒪᑖᕈᑏᑦ ᐱᔭᐅᓯᒪᔪᑦ ᐊᑐᕐᓱᑎᒃ ᓇᓪᓕᖃᕈᑕᐅᒍᓐᓇᓂᕐᐹᓂᒃ 2016-ᒥᓂᑕᕐᓄᑦ 1003-ᖑᓂᐊᖕᖑᓇᔭᐅᑦᓱᑎᒃ (95% CI 773-1302), ᓇᓪᓕᕐᑯᐊᖃᓕᕐᓱᑎᒃ 29%-ᓄᑦ ᐅᓄᕐᓱᒋᐊᕐᓱᒪᓂᕐᒧᑦ 2016-ᒥᓂᑦ.

ᐅᓄᕐᓂᓴᐅᑉᐸᑕ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᒋᒍᓐᓇᑕᖏᑦᑕ ᓱᓈᖏᓐᓂ 2021-ᒥ ᑕᑯᓐᓇᓱᑦ 2016-ᒥᓂᒐᑦ ᒪᕐᕉᓂᒃ ᖃᓄᐃᑦᑑᓂᖃᕈᓐᓇᑐᖅ - ᑕᒪᖏᓐᓅᓕᖓᖕᖏᑲᓗᐊᕐᓱᓂ - ᑎᒥᒃᑯᑦ ᐊᐅᓚᓂᖏᑦ, ᐃᓚᐅᑎᓪᓗᒍ 1) ᐊᑦᔨᒌᖕᖏᓂᖏᑦ ᓄᓇᒦᑦᓱᑎᒃ ᐊᐅᓚᓂᖏᑦ ᓇᓄᐃᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐊᒻᒪᓗ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᐅᑉ ᓂᐱᕕᐊᓂ ᐊᑕᐅᑦᓯᑯᖏᑐᖅ, ᐊᒻᒪᓗ 2) ᐅᓄᕐᓱᒋᐊᕐᑐᑦ ᐅᓄᕐᓂᖏᑦ ᐊᒥᓱᖕᖑᐸᓪᓕᐊᓂᖏᓐᓂ ᑐᕐᑯᕋᖕᖏᓂᕐᓴᐅᓂᖅ ᐱᑦᔪᑎᒋᑦᓱᒍ ᐅᓄᕐᓱᓯᒪᑦᓱᑎᓪᓗ ᐱᐊᕋᕐᑖᓯᒪᔪᑦ ᑕᒪᖏᓐᓄᓘᓐᓃᑦ. ᐊᑐᓂᑦ ᐅᖃᔭᕗᑦ ᐊᑖᓂ.

ᓯᕗᓪᓕᒥ, ᐊᐅᓚᓂᕕᓂᕐᑕᓕᐅᒍᓐᓂᑦ ᓇᓄᐃᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᐊᑭᐊᓄᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᐅᑉ ᓂᐱᕕᐊᑕ ᐃᓂᖃᕐᕕᖏᓐᓄᑦ 2021-ᒥ. ᑲᓱᕝᕕᖏᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂᒥᐅᑦ ᓯᕿᓂᖓᓂᒥᐅᓪᓗ ᐋᓐᑎᐊᓇᐆᐅᑉ ᑕᕐᕋᖓᓂ, ᑐᖕᖓᕕᖃᓚᐅᔪᑦ ᐊᐅᓚᓂᖏᓐᓂᒃ ᖃᐅᔨᔭᐅᖃᑦᑕᓂᖏᓐᓄᓗ ᓇᓗᓂᑦᑕᐅᓈᕐᓯᒪᔪᑦ ᐱᔭᐅᒋᐊᓪᓚᖃᑦᑕᑎᓪᓗᒋᑦ, ᓇᓄᒥᒃ ᐱᑦᔪᑎᖃᕈᓐᓇᕋᔭᖕᖏᑐᑦ ᐊᐅᓚᒍᓐᓇᓂᕐᒧᑦ, ᐃᕐᓯᓇᕐᑑᓲᖑᑦᓱᑎᓗ ᐊᒥᓱᑦ ᓇᓄᐃᑦ ᓄᓇᒥ ᕿᑭᕐᑕᓂ ᑕᓯᐅᔭᓂᓪᓗ ᐃᓂᖃᕐᕕᖏᑦᑕ ᓱᓈᖏᓐᓂ. ᐃᒥᒻᒪᑦ, ᐊᑦᔨᒌᖕᖏᓂᖃᓪᓛᐱᑦᑐᖅ ᐊᐅᓚᓂᖏᓐᓂ ᓇᓄᐃᑦ ᑭᓯᑕᐅᒪᓂᖏᓐᓂᒃ ᓱᕐᒡᓯᒪᒐᔭᕐᑐᓂᒃ ᒫᓐᓇᐅᑎᓪᓗᒍ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂ ᓯᕿᓂᖓᓂᓪᓗ. ᐊᑕᐅᑦᓱᑯᖃᑎᒋᑦᓱᒋᑦ 2021-ᒥ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᓂ, ᖃᐅᔨᓴᕐᓂᖃᓚᐅᔪᖅ ᐊᕙᑎᓕᕐᓂᑯᑦ ᓯᓚᐅᓪᓗ ᐊᓯᕐᔨᐸᓪᓕᐊᓂᖓ ᑲᓇᑕᒥ ᐋᓐᑎᐊᓇᐆᐅᓪᓗ ᑐᕐᖃᑕᕐᕕᖓ ᓄᓇᒥᑦ ᐱᓯᒪᔪᓂᒃ ᐱᑦᓴᑖᕐᕕᓴᖃᕐᓂᒧᑦ ᓇᐸᕐᑐᓕᕆᓂᕐᒧᒃᓗ ᖃᐅᔨᓴᕐᓯᒋᑦ ᐃᓗᓐᓈᒍᑦ ᐊᐅᓚᓂᖏᑦ ᓇᓄᐃᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂ ᓯᕿᓂᖓᓂᓪᓗ ᐃᓂᖃᕐᕕᖏᑦᑕ ᓱᓈᖏᓐᓂ. ᑕᒪᓐᓇ ᐱᓇᓱᐊᕐᓂᖅ ᐃᓚᖃᓚᐅᔪᖅ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᓐᓂᒃ ᑎᒥᖏᑦᑕ ᖃᓄᐃᑦᑐᓴᔭᐅᓂᖏᑦᑕᓗ ᐊᑐᓂᑦ ᐊᕐᕌᒍᑕᒫᑦ ᐊᐅᓚᓲᑦ ᓇᓄᐃᑦ, ᐊᓯᖏᓐᓄᑦ ᖃᐅᔨᓴᕐᑕᐅᒍᑎᖃᕐᒥᓱᑎᒃ. ᑕᒪᓐᓇ ᐱᓇᓱᑦᑕᐅᔪᖅ ᑲᔪᓯᒪᔪᒥᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂ ᐊᒻᒪᓗ ᖃᓂᖏᑐᒥ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂᒥᐅᑦ ᐃᓚᖓᓂ 2018-ᒥᓂᑦ. 2021-ᒥᓂᑦ, ᐋᓐᑎᐊᓇᐆᒥ ᓱᓈᓕᒫᑲᓵᖓ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐆᑦᑐᕋᕐᑕᐅᒍᑎᖃᓚᐅᔪᒻᒥᔪᑦ. ᓄᐃᑕᐅᓯᒪᔪᑦ ᑕᒪᒃᑯᓇᖕᖓᑦ ᓄᐃᑦᓯᓚᐅᔪᕗᑦ ᐊᐅᓚᓂᖃᒻᒪᓇᑐᐃᓐᓇᓇᐊᖃᕐᓂᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᐅᑉ ᓂᐱᕕᐊᓃᑦ ᓇᓄᐃᑦ ᓱᓈᓂᑦᓱᑎᒃ ᐊᐅᓚᑦᓯᔭᐅᕈᓐᓂᖏᑦᑕ ᐃᓱᓕᕝᕕᖏᓐᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓄᑦ 2021-ᒥ. ᐱᓗᐊᕐᑐᒥᒃ, 20%-ᒐᓛᑦ ᓇᓄᐃᑦ ᑎᒥᒃᑯᑦ ᖃᐅᔨᓴᕐᑕᐅᒍᑎᓕᕕᓃᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓃᑦ 2021-ᒥ ᐆᑦᑐᕋᕐᑕᐅᒍᑎᖃᕐᓯᒪᒻᒥᔪᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂ. ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂ ᐆᑦᑐᕋᐅᑎᑦᓴᑖᕐᓂᓴᕕᓂᐅᒐᓗᐊᕐᑎᓗᒋᑦ ᐊᕐᕌᒍᓂ ᐊᓂᒍᕐᑐᓂ ᖃᒻᒥᐅᓂᕐᓴᑯᑦ, ᑕᒪᒃᑯᐊ ᖃᐅᔨᔭᐅᓯᒪᔪᑦ, ᓄᐃᑕᐅᒍᑎᓂᒃ ᑐᕈᓐᓇᑎᑦᓯᒍᓐᓇᓱᑎᒃ, ᑕᒪᒃᑯᐊ ᖃᐅᔨᔭᐅᓯᒪᔪᑦ ᖃᖓᓕᒫᒃᑯᑦ ᐊᕐᕌᒍᒥ ᐊᑦᔨᒌᖕᖏᑐᓂ ᓇᓄᐃᑦ ᐊᐅᓚᓂᓇᓲᖏᓐᓂᒃ ᓇᔪᕐᑕᒥᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓄᑦ ᐊᐅᓚᓂᕐᓴᐅᓱᑎᒃ 2021-ᒥ. ᐅᖃᓇᐊᓪᓚᑐᒍᑦ ᑕᒪᓐᓇ ᐊᐅᓚᓂᐅᓂᕋᕐᑕᐅᔪᖅ ᓇᓄᓐᓄᑦ ᓴᕐᕿᑎᑦᓯᒍᑕᐅᖕᖏᒪᑦ ᐅᓄᕐᓯᓯᒪᒻᒪᓇᓐᓂᖏᓐᓂᒃ ᓇᓄᐃᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᓄᓇᕕᒻᒥᑦ

Wapusk-ᓗᓐᓃᑦ ᒥᕐᖑᐃᓯᕐᕕᖓᓂᑦ, ᑕᒪᓐᓇ ᐊᖏᔫᖕᖏᑐᒃᑯᑦ ᐊᕐᕌᒍᒥ ᐊᒥᓱᕕᑦᓱᑎᒃ ᐊᕐᔨᒌᖕᖏᒥᓇᓲᖏᑦ ᓄᓇᒦᑦᑐᑦ ᐊᐅᓚᓂᖏᑦ ᓇᓄᐃᑦ ᐅᐱᕐᖓᓯᐅᕙᓪᓗᓲᑦ ᐊᐅᓚᑕᐅᔪᑦ ᓯᓈᖏᓐᓂ.

ᓇᓄᐃᑦ ᐅᓄᕐᓯᐊᕐᓯᒪᓂᖏᑦ ᐱᑦᔪᑎᖃᑐᐃᓐᓇᓇᐊᖃᕐᒥᔪᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ 2021-ᒥ ᐱᐅᓂᕐᓴᐅᓕᕐᑐᑯᑦ ᑕᑯᑦᓴᐅᓂᖏᓐᓄᑦ ᐅᓄᕐᓂᖏᓐᓂ ᓇᓄᐃᑦ ᒐᑲᓂ. ᐅᓄᕐᓂᖏᑦ ᕿᑐᕐᖓᖏᑦᑕ 2021-ᒥ ᐅᓄᕐᑑᓚᐅᔪᑦ ᓄᐃᑦᓯᓱᑎᓗ ᐱᔭᐅᓲᖑᓂᖏᑦ ᑕᑯᓐᓇᓱᒋᑦ ᐱᓗᐊᕐᑐᒥᒃ ᐃᑭᑦᑐᑦ ᑕᑯᔭᐅᓯᒪᓂᖏᑦ 2016-ᒥ (Obbard et al. 2018). ᐊᒻᒪᓗ ᓱᓕ, ᐊᕐᕋᒍᒃ ᒪᕐᕉᒃ ᐊᓂᒍᕐᑎᓗᒋᒃ 2021-ᒥᓂᑦ ᐊᕐᕋᒍᓯᒪᔫᒃ ᐊᑯᓂᐅᓂᕐᐸᖅ ᓯᑯᖃᓚᐅᔪᑎᓪᓗᒍ ᑕᓯᐅᔭᕐᔪᐊᒥ 2021-ᒥᓂᑦ. ᑕᒪᒃᑯᐊ ᖃᓄᐃᑦᑐᒦᓐᓂᖏᑦ ᐱᐅᔫᑎᑦᓯᒐᔭᕐᑐᕕᓃᑦ ᕿᑐᕐᖏᐅᓂᖏᓐᓂᒃ ᐆᒪᓐᓇᓐᓇᓂᖏᓐᓄᓗ ᐊᕐᕋᒍᓐᓂ ᒪᕐᕉᓂ ᐊᓂᒍᕐᑑᓂ. ᓱᓕ, ᑕᑯᑦᓯᑦ ᑐᓴᕐᑎᓯᒍᑕᐅᓯᒪᔪᑦ ᐆᒪᔪᑦᑕᐅᓯᒪᔪᑦ ᑭᓯᑕᐅᒪᐅᑎᖏᓐᓂ, ᓇᓐᓄᑕᐅᓯᒪᔪᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐃᑭᓐᓂᓴᐅᓯᒪᒻᒥᔪᑦ 2016 2021-ᓗ ᐊᑯᓐᓂᖏᓐᓂ ᐊᒻᒪᓗ 2010 2015-ᓗ ᐊᑯᓐᓂᖏᓐᓂ (37.8 ᓇᓄᐃᑦ ᐊᕐᕋᒍᑕᒫᑦ ᑕᑯᓐᓇᓱᒋᑦ 58.8 ᓇᓄᐃᑦ ᐊᕐᕋᒍᑕᒫᑦ). ᒐᓗᐊᕐᑎᓗᒋᑦ, ᑕᒪᓐᓇ ᐃᑭᓪᓕᐅᒥᓯᒪᓂᖅ ᑕᒪᒃᑯᓇᓂ ᖃᖓᓂᑕᐅᓂᖏᓐᓂ ᒐᒥᑐᐃᓐᓇᑐᑦᓴᐅᔪᖅ 104 ᓇᓐᓄᑕᐅᓂᕕᓂᖏᓐᓄᑦ 2010/2011 ᒪᕐᕊᓐᓇᒥ. ᐅᓄᕐᑐᒪᕆᐅᓂᖏᑦ ᓇᓐᓄᑕᐅᔪᕕᓃᑦ 2010/11-ᒥ ᐅᓄᕐᓂᓴᐅᓂᖏᓪᓗ ᐆᒪᔪᕐᓯᐅᓴᐅᑎᒋᓐᓂᓴᐅᓂᕕᓂᖏᑦ ᐊᕐᕋᒍᓕ ᕐᑯᓕᓂ ᐊᓂᒍᕐᑐᓂ, ᓯᑯᖃᑦᓯᐊᖕᖏᓂᕕᓂᖓᓗ ᑖᒃᑯᓇᓂᑦᓴᓇᖅ ᐊᕐᕋᒍᓂ, ᐃᑭᓪᓕᓯᒪᐅᑎᐅᑐᐃᓐᓇᕆᐊᖃᕐᒥᔪᖅ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᖓᓂ 2011 2016-ᓗ ᐊᑯᓐᓂᖏᓐᓂ. ∇ᑉᐹᒍᑦ, ᐃᑉᐱᒋᔭᐅᔪᑦ ᐅᓄᕐᓯᓱᒪᓂᖏᑦ ᓇᓄᐃᑦ 2021-ᒥ ᐊᕐᕋᒍᑕᒫᑦ ᓇᓐᓄᓂᐅᓲᑦ ᐱᑕᖃᑦᓯᐊᖏᓐᓂᓴᐅᓂᕕᓂᖏᓐᓄᑦ, ᑕᐅᓄᖕᖓᐸᓪᓕᐊᔪᓂ ᐱᐅᔫᑯᑦ ᓄᓇᒥ ᓱᕐᒡᓂᖃᕐᒪᑕ, ᐃᓚᖃᕐᓯᑎᒃ ᓯᑯᖃᑦᓯᐊᓂᕐᓴᑯᑦ ᐱᐊᕋᖏᑦ ᐆᒪᓐᓇᓐᓇᓂᕐᓴᐅᓚᕿᑦᓯᑎᒃ.

ᓯᑯᐃᑦ ᖃᓄᐃᑦᑑᓂᖏᑦ ᐱᐅᔫᖃᑦᑕᓚᐅᔪᑦ ᓇᓄᕐᓄᑦ 2016 2021-ᓗ ᐊᑯᓐᓂᖏᓐᓂ, 2011 2016-ᓗ ᓴᓂᖏᓐᓂ, ᓇᓄᐃᑦ ᓯᑯᓐᓃᖏᓐᓇᓐᓇᖃᑦᑕᑎᓪᓗᒋᑦ ᐊᐅᒡᒍᓯᒧᑦ ᑎᑭᑦᓱᒍ. ᑖᒃᑯᐊ ᐊᕐᕋᒍᐃᑦ ᓯᑯᖃᑦᓯᐊᑐᕕᓂᐅᑎᓪᓗᒋᑦ, ᓇᓐᓄᑐᖃᓪᓗᐊᖃᑦᑕᑎᓐᓇᒍ, ᐅᓄᕐᓂᖏᓐᓂᒃ ᐅᓄᕐᓯᒋᐊᕐᓯᒪᑎᑦᓯᔪᕕᓂᐅᒍᓐᓇᑐᑦ. 2021-ᒥ ᖃᐅᔨᓴᕐᑕᐅᑎᓪᓗᒋᑦ, ᕿᑐᕐᖏᐅᓯᐊᕐᑐᕕᓃᑦ. ᒐᓗᐊᕐᑎᓗᒍ, 2021 ᐊᕐᕋᒍᖓ ᓯᑯᖃᕐᓂᖓ ᐊᑯᓃᖕᖏᓂᕐᐸᐅᓚᐅᔪᖅ ᐊᕐᕋᒍᓂ ᕐᑯᓕᓂ ᐊᓂᒍᕐᑐᓂ ᕿᑐᕐᖓᐅᔪᐃᓪᓗ ᐊᓐᓇᐅᒪᒍᓐᓇᓂᖏᑦ ᓱᕋᑕᐅᓐᓇᓱᑎᒃ. 2021-ᒥ ᓯᑯᖃᑦᓯᐊᖏᓐᓂᖅ ᐊᓐᓇᐅᒪᒍᓐᓇᓂᖏᓐᓂᒃ ᓱᕐᒡᓯᒪᐸᑉ ᓇᓄᓐᓂᒃ, ᒫᓐᓇᐅᑎᓪᓗᒍ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕐᑕᐅᒍᑎᖏᑦ ᐱᐅᔫᑯᑦ ᓂᕆᐅᕐᓇᓂᖃᑦᓯᐊᒪᕆᓚᖓᔭᖅ.

ᒫᓐᓇᐅᑎᓪᓗᒍ, ᑐᓴᐅᒪᔭᐅᒋᐊᓕᑦᑕᖃᑦᓯᐊᖏᑦᑐᒍᑦ ᓈᒻᒪᑐᓂᒃ ᖃᐅᔨᒪᒍᓐᓇᓂᕐᒧᑦ ᐊᐅᓚᓂᖏᓐᓂᒃ ᐱᐅᓯᓯᒪᒻᒪᖕᒐᓗᓐᓃᑦ ᐆᒥᓐᓇᒍᓐᓇᓂᖏᑦ ᐱᔪᕕᓂᐅᑐᐃᓐᓇᕆᐊᖃᒪᑕ ᐅᓄᕐᓯᓱᒪᓂᕕᓂᓐᓄᑦ 2016 2021 ᐊᑯᓐᓂᖏᓐᓂ. ᑖᒃᑯᐊ ᑕᒪᕐᒥᒃ ᐱᑦᔪᑎᐅᐅᓐᓇᒥᔫᒃ ᓇᓄᖃᑦᓯᐊᓂᖓᓐᓄᑦ. ᖃᓄᓪᓗᐊᑎᒋᒃ ᐱᓂᐊᕐᓂᖃᕐᓂᖏᑦ ᑕᒪᒃᑯᐊ ᖃᓄᐃᑦᑑᒦᒍᑏᑦ ᓱᓇᐅᒻᒪᖕᒐᑕ ᖃᐅᔨᒪᓇᖕᖏᑐᖅ ᐋᕐᕿᒋᐊᕋᓱᐊᕐᓂᒧᑦ. ᐃᑉᐱᒋᔭᐅᖏᓐᓇᓂᖏᑦ ᕿᑐᕐᖏᐅᓂᖏᑦᑕ, ᐊᓐᓇᐅᒪᒍᓐᓇᓂᖏᑦᑕ, ᐊᕐᕋᒍᒥᓪᓗ ᖃᖓᓕᒫᖅ ᐊᐅᓚᓂᖏᑦ ᑕᒪᖏᓐᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂ ᓯᕿᓂᖓᓂᓪᓗ ᐱᓪᓚᓇᐅᓚᖓᕗᑦ ᑲᔪᓯᒍᓐᓇᓂᕐᒧᑦ ᑐᓴᐅᒪᔭᐅᖏᓐᓇᑎᑦᓯᓂᕐᒧᑦ ᐊᐅᓚᑦᓯᓂᓕᓇᓂᕐᓂᒃ ᐊᑑᑎᖃᑦᑕᕕᖏᓐᓂ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᓂ. ᖃᐅᔨᓚᐅᔪᕗᒍᑦ ᐱᐅᖕᖏᓂᒻᒪᓇᓐᓂᒃ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᓂ ᐊᓯᖏᑎᒍᑦ ᖃᐅᔨᓴᐅᑏᑦ ᓴᓂᖏᓐᓂ, ᐆᑦᑑᑎᒋᓗᒍ ᖃᓄᐃᑦᑐᓴᔭᐅᓂᖏᓐᓂᒃ ᐱᒐᓱᐊᕐᓂᖅ ᓇᓗᓂᑦᑕᐅᓯᒪᔪᓂᒃ ᑎᒥᒃᑯᓘᓐᓂᑦ ᖃᐅᔨᒪᓇᐅᑎᖏᓐᓂᒃ ᐊᓯᖏᓪᓗ ᑐᓴᐅᒪᔭᐅᒋᐊᓖᑦ ᐱᔭᐅᔫᖑᑦᓯᑎᒃ ᐃᑲᔪᕐᓯᓂᕐᒧᑦ ᐊᓯᑦᔨᒍᑎᓂᒃ ᑐᑭᓯᒍᓐᓇᓂᕐᒧᑦ ᐱᑕᖃᑦᓯᐊᓂᖏᓐᓂᒃ ᓯᕗᓂᕐᒥ.

ᐃᓱᒪᒋᐅᑦᔨᓃᑦ ᓄᑖᓂᒃ ᑐᓴᐅᒪᔭᐅᒋᐊᓕᓐᓄᑦ ᐊᑦᑕᓇᑐᐃᓐᓇᓇᐊᓕᓐᓂᒃ ᖃᐅᔨᓴᕐᓂᓂ

ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᖃᐅᔨᓴᕐᓂᖅ ᖃᖓᑦᑕᔫᒃᑯᑦ ᑐᓴᕐᑎᓯᒍᑏᑦ ᐱᔭᕇᕐᓯᒪᓕᕐᑐᑦ ᐅᑦᑐᑑᑎᐅᓯᒪᓕᕐᓱᑎᓪᓗ ᐊᐅᓚᑦᓯᓂᓕᓇᓂᕐᒥ ᐱᔪᓐᓇᑎᑦᓯᔨᓄᑦ (ᑎᓯᐱᓇ 2022). TWG ᐃᓱᒪᒋᐅᑦᔨᓯᒪᓕᕐᑐᖅ ᓄᑕᐅᓯᓕᕐᑎᑕᐅᔪᑦᓴᐅᒪᖕᒐᑕ 2019-ᒥ ᐆᒪᔪᕐᓂᐊᓂᕐᒥ ᐊᑦᑕᓇᑐᐃᓐᓇᓇᐊᓖᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᓐᓂᒃ 2021-ᒧᑦ ᐱᑕᖃᑦᓂᖓᑕ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕐᑕᐅᓂᖏᓐᓄᑦ ᓄᑖᖑᓂᕐᐸᓗ ᐆᒪᔪᕐᓯᒪᓃᑦ ᑐᑭᓯᑕᐅᒪᐅᑎᖏᑦ. ᐆᒪᔪᕐᓂᒥ ᐊᐅᓚᑦᓯᓂᓕᓇᓂᐅᑉ ᑐᖕᖓᕕᖓ Regehr et al.-ᒥ (2021) ᐋᕐᕿᑕᐅᓯᒪᔪᑦ ᓄᑖᑦ ᑎᒥᖏᓐᓄᓕᖓᔪᑦ ᑐᓴᐅᒪᔭᐅᒋᐊᓖᑦ ᐊᑐᕐᑕᐅᕈᓐᓇᕋᔭᕐᒪᑕ ᑐᑭᑖᕈᑎᖃᕐᓂᒧᑦ ᐃᓗᓐᓄᓄᓕᖓᔪᓂ ᐆᒪᔪᕐᓂᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᖃᐅᔨᓴᕐᑕᐅᓯᐊᓪᓕᓇᐊᖃᖕᖏᑑᓗᑎᒃ. ᓄᑕᐅᓯᓖᒍᓐᓇᕋᔭᖓᓗᐊᕐᑎᓗᒋᑦ ᐆᒪᔪᕐᓂᒥ ᐊᑦᑕᓇᑐᐃᓐᓇᓇᐊᓖᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᓐᓂ, ᐊᑑᑎᓲᑦ Regehr et al.-ᖑᓇᕐᒪᑦ (2021) ᑐᒡᓐᓇᑐᒥᓪᓗ ᐃᓚᐅᑎᑦᓯᓱᑎᒃ 2021-ᒥ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂᒃ ᐱᑕᖃᕐᓂᖏᓐᓂ ᖃᒻᒥᑯᓪᓗ ᐆᒪᔪᕐᑕᐅᓯᒪᔪᑦ ᑭᓯᑕᐅᒪᐅᑎᖏᓐᓂ, TWG ᑕᒪᑦᓯᒥᖓ ᐱᐅᓂᕐᓴᐅᑎᑦᓯᓚᖓᔪᓇᑦᓯᖏᑦᑐᑦ ᓄᐃᑕᖏᓐᓂᒃ ᑐᓴᐅᒪᔭᐅᒋᐊᓖᓂᒃ ᑕᑯᓐᓇᓱᒋᑦ ᐊᑑᑎᔭᐅᔫᓇᕋᔭᕐᑐᑦ ᐊᑖᓂᑦᑐᑦ, ᖃᐅᔨᓴᕐᑕᐅᒋᐊᓪᓕᕈᑕᐅᒋᐊᖃᖕᖏᑐᓂ. ᑕᒪᓐᓇ ᐱᑦᔪᑎᓕᒃ ᓄᑖᖅ ᑐᓴᐅᒪᔭᐅᒋᐊᓖᓐᓄᑦ ᑎᒥᖏᓐᓄᓕᖓᔪᓂ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᓖᑦ ᓄᑕᐅᓯᓕᕐᓱᒪᕙᓪᓗᑐᓂᒃ ᑐᖕᖓᕕᖃᕐᒪᑕ ᐱᑕᖃᕐᓂᖏᓐᓂᒃ 2021-ᒥ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᒥᑦ, ᐃᓚᖃᕐᓯᑎᒃ ᓇᓗᓇᕐᓯᓱᒪᔪᓂᒃ

ᐊᑦᑭᒋᐊᕐᑕᐅᓴᐅᑎᒋᕐᖃᔭᖕᖏᑐᓂᒃ ᐊᑐᐃᓐᓇᑎᒍᑦ ᖃᓇᑕᐅᔭᒨᔭᕐᑕᐅᓯᒪᔪᓄᑦ. ᐊᑑᑎᔭᐅᒍᓐᓇᒐᔭᕐᑐᑦ ᓴᕐᕿᑎᑕᐅᔪᑦ ᑕᕝᕙᓂ ᐊᑭᑭᓐᓂᓴᐅᒻᒥᔪᑦ ᓄᑕᐅᓯᓕᕐᓯᒪᔪᑦ ᖃᐅᔨᓴᐅᑏᑦ ᐊᑦᑕᓇᑐᐃᓐᓇᓇᐊᓕᓐᓂᒃ ᓴᓂᖏᓐᓂ, ᐊᑭᖃᓇᐊᖃᒐᔭᕐᓱᑎᒃ $30,000-ᑖᓚᓂᒃ ᐊᒻᒪᓗ ᑕᕐᕿᓂ ᐱᖓᓱᔪᕐᑐᓂ ᐱᓇᓱᑦᑕᐅᒋᐊᖃᕋᔭᕐᓱᑎᒃ.

ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ TWG-ᑯᑦ ᓇᓗᓐᕐᓯᓯᒪᕗᑦ ᐅᑯᓂᖓ ᖃᓄᐃᑦᑐᑰᕐᓂᐅᒍᓐᓇᑐᓂᒃ ᐃᑲᔪᕐᓯᓂᕐᒧᑦ ᓇᓗᓐᕐᓯᓂᕐᒥᒃ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓃᑦ ᖃᓄᐃᓪᓗᐊᓂᖏᓐᓂᒃ ᐅᓐᓂᑑᑕᐅᒍᓐᓇᓂᖏᑦ ᓯᕿᓂᕐᒥᐅᓂ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᖓᓂ ᐃᓱᒪᒋᑦᓱᒋᑦ ᓄᑖᑦ ᐳᕐᑐᓂᕐᓴᓗ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑏᑦ ᐱᑕᖃᕐᓂᖏᓐᓂᒃ 2021-ᒥ ᖃᖓᑦᑕᔫᑯᑦ ᖃᐅᔨᓴᐅᑎᕕᓂᕐᓂ (Northrup et al. 2022) ᐃᓚᒋᔭᐅᑎᓪᓗᒋᑦ ᖃᐅᔨᒪᓇᖕᖏᕈᑎᓕᒫᑦ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂ ᑐᔭᐅᔪᓂ ᕐᑯᓛᓂ. ᑕᒪᒃᑯᐊ ᖃᓄᐃᑦᑑᓂᐅᒍᓐᓇᑐᑦ ᑐᑭᓯᓐᓇᐅᑎᓖᑦ ᐊᑖᓂ (ᐃᒻᒥᒍᑦ ᖃᓄᐃᑦᑐᒦᓐᓂᐅᔭᕐᑐᓂᑦ ᐱᑕᖃᕐᓂᖏᑦᑕᓗ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕐᑕᐅᒍᑎᖏᓐᓂ), ᐃᓚᒋᖃᕐᓱᑎᒃ ᐊᑯᓂᐅᖕᖏᓐᓂᒃ ᐊᓪᓚᑕᐅᒪᐅᑎᖏᓐᓂᓗ ᐊᑦᑕᓇᑐᐃᓐᓇᓇᐊᓖᑦ ᖃᓄᐃᑦᑐᒦᓐᓂᑕᐅᒍᑎᖏᓐᓂᒃ TWG-ᒧᓕᖓᔪᑦ ᐅᓐᓂᑑᑎᕐᖃᕕᓂᖏᓐᓂ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓃᑦ ᐅᓄᕐᓂᖏᓐᓂ ᑐᖕᖓᕕᒋᑦᓱᒋᑦ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᓂᒃ ᓇᓐᓄᓂᕐᓂᒃ ᐊᑦᑕᓇᑐᐃᓐᓇᓇᐊᓖᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᓐᓂᒃ (Regehr et al. 2021). ᐃᓚᒋᐊᕈᑎᒋᑦᓱᒍ ᑕᒪᒃᑯᓄᖓ ᐱᔭᐅᒍᓐᓇᑐᑦ ᐅᓐᓂᑑᑕᐅᓂᖏᓐᓄᑦ, TWG ᐅᓐᓂᑑᑎᖃᕐᑯᖅ ᓄᑕᐅᓯᓕᕐᓯᒪᔪᓂᒃ ᖃᐅᔨᓴᐅᑎᓂᒃ ᐃᑲᔪᕐᓯᒐᔭᕐᑐᓂᒃ ᐊᑭᑭᒋᐊᕆᓂᕐᒧᑦ ᖃᐅᔨᒪᓇᖕᖏᕈᑎᖏᓐᓂᒃ ᓄᓇᒫᓕᖓᔪᑦ ᖃᓄᐃᑦᑑᓂᖏᓐᓂ ᐱᑦᓴᑖᕐᕕᐅᒍᓐᓇᑐᓂᓪᓗ ᐆᒪᔪᕐᓂᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐊᑭᐊᓂᒥᐅᓂᓗ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᐅᑉ ᓂᐱᕕᐊᓂ ᐃᓂᖃᕐᕕᓕᓐᓂ. ᖃᐅᔨᓴᕐᓂᐅᕐᑯᔭᐅᔪᑦ ᑐᑭᓯᓐᓇᑎᑕᐅᕗᑦ ᐊᓪᓚᕐᑯᑎᐅᑉ ᐃᓱᐊᓂ.

ᐊᑑᑎᔭᐅᒍᓐᓇᑐᑦ

ᖃᓄᐃᑦᑑᓂᐅᖓᔭᕐᑐᖅ

ᐱᖓᓱᑦ ᖃᓄᐃᑦᑐᒦᓐᓂᐅᖓᔭᕐᑐᑦ ᑐᑭᓯᓐᓇᑎᑕᐅᓯᒪᔪᑦ 2019-ᒥ ᐆᒪᔪᕐᓂᒥ ᐊᑦᑕᓇᑐᐃᓐᓇᓇᐊᓖᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᓐᓂ ᒫᓐᓇᒧᓕᖓᔪᓂ ᓯᕗᓂᕐᒥᓗ ᓄᓇᒥ ᖃᓄᐃᑦᑐᒦᓐᓂᖃᕈᑎᖏᓐᓂ ᐊᐅᓚᒍᓐᓇᐅᑎᖏᓐᓂ ᐊᕙᑎᐅᑉ ᖃᓄᐃᑦᑑᓂᖏᓐᓂ (ᕐᑯᓛᓃᑦᑐᑦ ᑕᑯᒋᐊᕐᓗᒋᑦ), ᐃᓚᒋᔭᐅᑎᓪᓗᒍ ᓂᓇᐅᕐᓂᖃᑦᓯᐊᓇᕐᑐᖅ ᖃᓄᐃᑦᑑᓂᐅᖓᔭᕐᑐᖅ 1, ᕿᑎᖓᓃᑦᑐᖅ ᐊᑑᑎᔪᓂ ᖃᓄᐃᑦᑐᒦᓐᓂᐅᖓᔭᕐᑐᖅ 2, ᐊᒻᒪᓗ ᓱᒋᐊᓪᓚᕕᕈᕐᓯᒪᔪᕐᑎᑐᑦ ᑕᑯᓐᓇᑕᐅᔪᖅ ᖃᓄᐃᑦᑑᓂᐅᖓᔭᕐᑐᖅ 3 (Regehr et al. 2021). ᐱᖓᓱᐃᓂᑦ ᖃᓄᐃᑦᑑᓂᐅᖓᔭᕐᑐᓂᑦ ᓴᕐᕿᑎᑕᐅᔪᓂ 2019-ᒥ ᐆᒪᔪᕐᓂᒥ ᐊᑦᑕᓇᑐᐃᓐᓇᓇᐊᖃᕐᓂᖏᑦᑕ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᓐᓂ, TWG ᐃᓱᒪᒋᐅᑦᔨᕗᖅ ᖃᓄᐃᑦᑑᓂᐅᖓᔭᕐᑐᖅ 2 ᓈᒻᒪᓂᕐᐸᐅᖏᓐᓇᓇᐊᖓ ᓴᕐᕿᑎᑦᓱᓂᕐᒧᑦ ᐊᑯᓃᕐᑐᑯᑦ ᓄᓇᒥ ᖃᓄᐃᑦᑐᒦᓐᓂᖓᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ. ᐅᓄᕐᓯᒋᐊᕐᓯᒪᕋᓗᐊᕐᑎᓗᒋᑦ ᐅᓄᕐᓂᖏᑦ ᐃᑉᐱᒋᔭᐅᓯᒪᔪᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᑕᑯᓐᓇᓱᒋᑦ 2021-ᒥ ᖃᐅᔨᓴᕐᓂᒧᑦ ᓄᐃᑕᐅᔪᕕᓃᑦ, TWG-ᑯᑦ ᐃᓱᒪᒋᐅᑦᔨᕗᑦ ᑕᒪᓐᓇ ᓄᐃᑦᓯᓂᐅᖕᖏᒪᑦ ᐊᓯᑦᔨᓂᖏᓐᓂᒃ ᐊᑯᓃᕐᑐᑯᑦ ᐱᕈᕐᐸᓕᐊᓚᖓᓂᖏᓐᓂᒃ ᐅᓄᕐᓂᖏᑦᑕ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᑦ, ᓴᐳᑦᔨᓯᒪᒐᔭᕐᓱᑎᒃ ᓂᓇᐅᕐᓂᖃᑦᓯᐊᑐᒥᒃ ᖃᓄᐃᑦᑑᓂᐅᖓᔭᕐᑐᒥᒃ (ᖃᓄᐃᑦᑑᓂᐅᖓᔭᕐᑐᖅ 1), ᑭᓯᐊᓂ ᓄᐃᑕᐅᔪᐃᖓᖅ ᑕᒪᖏᓐᓂ ᐊᐅᓚᓂᖏᓐᓂ ᓇᓄᐃᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂᑦ ᓯᕿᓂᖓᓄᑦ ᐊᖏᓕᒋᐊᕐᓯᒪᑐᐃᓐᓇᓇᐊᖃᕐᓂᖓᓗ ᓄᓇᖓᑕ ᓯᑯᖃᑦᓯᐊᓂᖓᓂ ᐆᒪᔪᑕᐅᖏᓐᓂᓴᐅᓂᖏᓪᓗ 2016 2021 ᐊᑯᓐᓂᖏᓐᓂ. ᓱᓕ, ᒫᓐᓇᐅᑎᓪᓗᒍ ᓴᐳᑎᒍᑕᖃᖕᖏᑐᑦ ᓱᕐᖃᔭᕐᓯᒪᓂᐊᖕᖑᓇᕐᑐᓂ (ᖃᓄᐃᑦᑑᓂᐅᖓᔭᕐᑐᖅ 3a ᐊᒻᒪᓗ 3b) ᑕᑯᓐᓇᒍᑎᐅᖓᔭᕐᑐᕕᓂᐅᑦᓯᓂ ᐃᑭᓪᓕᕙᓪᓕᐊᔪᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐱᑕᖃᕐᓂᖏᓐᓂᒃ ᐃᒫᑦᓴᓇᖅ ᐃᑭᓪᓕᕙᓪᓕᐊᓂᕐᒪᑕ 2011 2016-ᓗ ᐊᑯᓐᓂᖏᓐᓂ.

ᓴᐳᑎᔭᐅᑎᓪᓗᒍ ᖃᓄᐃᑑᓂᐅᖓᔭᕐᑐᒧᑦ (ᖃᓄᐃᑦᑑᓂᐅᖓᔭᕐᑐᖅ 2) ᑐᖕᖓᕕᐅᒍᓐᓇᓱᓂ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐊᑑᑎᕈᓐᓇᖏᓐᓇᑑᔭᕐᑐᖅ, ᐱᓪᓚᓇᑦᑐᓂᒃ ᖃᐅᔨᒪᓇᖕᖏᓂᕐᑕᖃᖏᓐᓇᑐᑦ ᐱᑕᖃᕐᓂᖏᓐᓄᓕᖓᔪᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐊᑐᕐᓂᒧᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᓐᓂᒃ ᐆᒪᔪᕐᑕᐅᓂᖏᑦᑕ ᐅᓄᕐᓂᖏᑦ ᐅᒥᑦᑐᓴᓐᓇᐅᖏᓐᓇᓴᔭᕐᑎᓗᒋᑦ. ᐊᑖᓂ ᓴᕐᕿᑎᑦᓯᔪᒍᑦ ᖃᓄᐃᑦᑐᑰᕈᑎᐅᒍᓐᓇᑐᓂᒃ ᐱᑕᖃᕐᓂᖏᑦᑕ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂ ᐊᑐᕐᑕᐅᕈᓐᓇᑐᓂᒃ ᓱᕐᕐᑯᐃᓯᓂᕐᒧᑦ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᓂᒃ, ᐱᑦᔪᑎᖃᕈᑎᖏᑦ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂ ᐊᑦᑕᓇᕈᑎᐅᒍᓐᓇᑐᐃᓪᓗ ᐊᑐᓂᑦ ᐊᑐᕐᓱᑦ ᓄᐃᑦᓯᓂᕐᒧᑦ ᐆᒪᔪᕐᓂᓂᒃ.

ᐱᑕᖃᕐᓂᒥ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑏᑦ

ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ 1: ᓄᑕᐅᓯᓕᕐᓯᒪᔪᑦ ᐅᓐᓂᑑᑏᑦ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᓂ ᑐᖕᖓᕕᖃᕐᓱᑎᒃ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂᒃ 895-ᓂᒃ ᓇᓄᕐᓂᒃ (ᐆᑦᑑᑎᒋᓗᒍ ᐊᕐᓇᖅ ᐊᖑᑎᓗ)

- **ᐱᑦᔪᑎᐅᒍᓐᓇᑐᑦ:** ᐱᑕᖃᕐᓂᖓ 1119 ᑲᑎᓕᕋᒥᑦ ᓇᓄᐃᑦ ᓇᓛᒫᓐᓂᐸᐅᕗᖅ ᑭᓯᑕᐅᒪᓂᖏᓐᓄᑦ ᓇᓄᐃᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐊᐅᓚᑦᓯᓂᓕᕆᓂᕐᓂ ᐃᓱᓕᕝᕕᖏᓐᓂ 2021-ᒥ ᖃᖓᑦᑕᔫᑯᑦ ᖃᐅᔨᓴᕐᓂᒥ (Northrup et al. 2022).

ᒐᓗᐊᕐᑎᓗᒍ, ᑕᒪᓐᓇ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᕈᑎ ᐊᒥᓱᓂᒃ ᐱᑦᓴᑖᕐᕕᓴᓂᒃ ᖃᐅᔨᒪᓇᖕᖏᑑᑎᓪᓗᒍ. ᓯᕗᓪᓕᒥ, 1119-ᖑᓂᐊᖕᖑᓇᓴᐅᔪᑦ ᓇᓄᐃᑦ ᐃᓚᖃᕐᑐᕕᓂᐅᔪᑦᓴᐅᔪᖅ ᐆᒪᔪᓂᒃ ᐃᓚᒋᔭᐅᔪᕕᓂᐅᔪᑦᓴᐅᔪᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂ ᐃᓂᖃᕐᕕᓕᓐᓂ ᓅᑦᑐᕕᓂᕐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓄᑦ 2021-ᒥ ᖃᖓᑦᑕᔫᑦᑯᑦ ᖃᐅᔨᓴᕐᑕᐅᑎᓪᓗᒋᑦ. ᐋᕐᕿᓯᒪᑎᑦᓯᓂᖅ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᓂ ᑐᖕᖓᕕᒋᑦᓱᒋᑦ ᐅᓄᕐᓂᖏᑦᑕ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕐᑕᐅᒍᑎᖏᓐᓂ ᐅᓄᕐᓯᒋᐊᕐᑎᓯᒍᓐᓇᓱᓂ ᐆᒪᔪᓗᐊᓱᖃᑦᑕᓂᕐᒧᑦ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᕐᒥᐅᓂ ᐃᓱᒪᒋᑦᓱᒋᑦ ᖃᐅᔨᒪᓇᖕᖏᑐᑦ ᖃᓄᐃᓪᓗᐊᓂᖏᑦ ᒐᒃᑯᐊ ᓇᓄᐃᑦ ᐃᓚᒋᔭᐅᓪᓚᓇᑦᑐᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐃᓂᖃᕐᕕᓕᓐᓂᒃ. ᑐᖓᓕᖓ, 35%-ᒐᓛᖏᑦ ᑖᒃᑯᐊ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑏᑦ ᐃᓚᖃᓚᐅᔪᑦ ᕿᑐᕐᖓᖏᓐᓂᒃ ᐊᕐᕌᒍᒥ (C0s) ᐅᕕᒃᑲᖏᓪᓗ (C1s). ᑕᒪᓐᓇ ᐱᐅᓯᕐᒥᒃ ᐅᓄᕐᓂᓴᒻᒪᓇᓐᓂᒃ ᐱᐊᕋᕐᑕᓕᒃ, ᒪᓕᒐᓗᐊᕐᓱᑎᒃ 2011-ᒥ 2016-ᒥᓪᓗ ᖃᖓᑦᑕᔫᑦᑯᑦ ᖃᐅᔨᓴᕐᓂᕕᓃᑦ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂᒃ. ᐱᐊᕋᖏᑦ ᐆᒪᒐᓱᐊᕐᖃᔭᕋᑕᖕᖏᑐᑦ ᐃᒻᒥᓂᕿᓗᑎᒃ ᐱᔭᐅᓲᖑᖕᖏᒪᑕ ᐃᓘᓐᓈᒍᓪᓗ ᐆᒪᒐᓱᐊᕈᓐᓇᓂᖏᑦ ᒥᑭᓂᕐᓴᐅᓱᑎᒃ ᐊᓯᖏᑦᑕ ᓇᓄᐃᑦ ᓴᓂᖏᓐᓂ, ᑭᓱᑦᓱᒋᑦ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓃᑦ ᐅᓄᕐᓂᖏᑦ ᐊᑐᕐᓱᒋᑦ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂᒃ ᑲᑎᓕᕋᒥᑦ ᐱᑕᖃᕐᓂᖏᑦᑕ ᐃᓚᓖᑦ ᐊᒥᓱᓂᒃ ᐆᒪᑕᐅᖏᓐᓇᑐᓂᒃ ᐱᐊᕋᖏᓐᓂᒃ. ᐆᒪᔪᕐᑕᐅᓗᐊᖃᑦᑕᓱᒍᑎᐅᕈᓐᓇᑐᖅ.

- ᑕᒪᒃᑯᐊ ᖃᐅᔨᒪᓇᖕᖏᑐᑦ ᐱᑦᔪᑎᒋᑦᓱᐱᑦ, ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ 1 ᓇᓄᐃᑦ ᐱᑕᖃᕐᓂᖏᓐᓂᒃ 895-ᓂᒃ ᐱᑕᓕᒃ 2021-ᒥ ᐊᑑᑎᖃᕐᓂᓴᑦ ᓱᕐᕐᑯᐃᓱᓂᕐᒧᑦ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᓂᒃ. ᐱᑕᖃᕐᓂᖏᑦ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᑦ ᑐᖕᖓᕕᖃᕐᑐᑦ ᒃᑎᓕᕋᒥᑦ ᐱᑕᖃᕐᓂᖏᑦᑕ ᐃᓚᓖᑦ ᐊᒥᓱᓂᒃ ᐆᒪᑕᐅᖏᓐᓇᑐᓂᒃ ᐱᐊᕋᖏᓐᓂᒃ. ᐆᒪᔪᕐᑕᐅᓗᐊᖃᑦᑕᓱᒍᑎᐅᕈᓐᓇᑐᖅ.
- ᑕᒪᒃᑯᐊ ᖃᐅᔨᒪᓇᖕᖏᑐᑦ ᐱᑦᔪᑎᒋᑦᓱᐱᑦ, ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ 1 ᓇᓄᐃᑦ ᐱᑕᖃᕐᓂᖏᓐᓂᒃ 895-ᓂᒃ ᐱᑕᓕᒃ 2021-ᒥ ᐊᑑᑎᖃᕐᓂᓴᑦ ᓱᕐᕐᑯᐃᓱᓂᕐᒧᑦ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᓂᒃ. ᐱᑕᖃᕐᓂᖏᑦ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᑦ ᑐᖕᖓᕕᖃᕐᑐᑦ ᒃᑎᓱᒪᓂᖏᓐᓂᒃ ᐱᑕᖃᕐᓂᖏᑦᑕ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐊᒻᒪᓗ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᕕᓃᑦ 2021-ᒥ 2016-ᒥᓪᓗ ᐊᑦᔨᖃᒐᓚᑦᑐᖅ 1621-ᒐᓚᓐᓃᑐᓂᒃ (Northrup et al. 2022; Atkinson et al. 2022), ᓴᐳᑦᔨᔪᑦ ᓄᓪᓚᖓᓂᖏᓐᓂᒃ ᓇᓄᖃᕐᓂᖓᓂᒃ ᑕᒥᐅᔭᕐᔪᐊᓕᒫᒥ ᐃᓘᓐᓈᒍᑦ. ᒐᒪ, ᑐᖕᖓᕕᒋᑦᓱᒋᑦ ᖃᓄᐃᑦᑐᔭᐅᓂᖏᑦᑕ ᓇᓗᓂᕐᑕᐅᒍᑎᖏᑦ ᐆᑦᑐᕋᐅᑎᑖᕐᕕᐅᓯᒪᔪᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᓂᐱᕕᐊᓂᓗ ᓯᓛᖏᓐᓂ ᑎᒥᖏᒍᑦ ᓇᓗᓂᕐᑕᐅᒍᑎᖏᑦ ᐆᓗᓂᒃᑯᑦᑕᓱᒋᑎᒃ ᓇᓗᓂᒃᑯᑦᑕᑖᓱᒋᑎᓗ, 20%-ᒐᓛᑦ ᓇᓄᐃᑦ ᓇᓗᓂᕐᑕᐅᒍᑎᑖᕐᓯᒪᔪᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ 2021-ᒥ ᓇᓗᓂᕐᑕᐅᒍᑎᖃᓇᕐᓯᒪᔪᑦ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᐅᑉ ᓂᐱᕕᐊᓂ (Northrup et al. 2022) ᑕᒐ ᐃᒻᒪᖄ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᐅᑉ ᓂᐱᕕᐊᓂ ᓇᓄᐃᑦ ᐃᓂᖃᕐᕕᖏᑦᑕ ᓱᓈᖏᓐᓃᑐᕕᓂᐅᑐᐃᓐᓇᕆᐊᓖᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐃᓂᖃᕐᕕᓕᓐᓂ ᖃᖓᑦᑕᔫᑦᑯᑦ ᖃᐅᔨᓴᕐᑕᐅᑎᓪᓗᒋᑦ. ᐃᑐᒻᒪᑦ ᑕᒪᓐᓇ ᐱᑕᖃᓪᓚᓇᓐᓂᖓᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ 895-ᒥᓐᓂᓴᐅᓚᕿᑎᑦᓱᒍᓐᓇᑐᖅ (80%-ᖏᑦ 1119-ᓂ) ᐅᓄᕐᓯᒋᐊᕐᓂᐸᐅᑦᓱᓂᓗ ᓇᓄᐃᑦ ᐱᑕᖃᕐᓂᖏᓐᓂᒃ ᐃᑉᐱᒋᔭᐅᓯᒪᔪᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ 2021-ᒥ ᑐᖕᖓᕕᖃᓚᐅᔪᖅ ᐊᐅᓚᓂᖏᓐᓂᒃ ᓯᕿᓂᐅᑉ ᓂᐱᕕᐊᓂᑦ ᓯᕿᓯᖓᓄᓂᕐᓴᖅ ᐆᒪᔪᕐᑕᐅᖏᓐᓂᓴᐅᒐᔭᕐᓱᑎᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᖓᓂ ᐅᑭᐅᒃᑯᑦ. ᐆᒥᒻᒪᑦ ᑕᒪᓐᓇ ᓄᐃᑦᓯᓚᕿᔪᖅ ᓯᓕᓂᖓᓂᒃ 895-ᓂᒃ ᐱᑕᖃᕐᓂᐊᖑᓇᓴᐅᓂᖏᓐᓂᒃ ᐆᒪᔪᕐᑕᐅᓱᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐃᓂᖃᕐᕕᓕᓐᓂᒃ ᐊᕐᕌᒍᓂ ᐊᒥᓱᓂ ᐊᓂᒍᕐᑐᓂ.
- **ᐊᑦᑕᓇᑐᐃᓐᓇᓇᐊᓕᒃ:** ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ 1 ᐊᑦᔨᖃᒐᓛᕐᑐᖅ, ᐃᑭᓐᓂᓴᐅᓛᐱᑦᓱᓂᓗᓐᓃᑦ, ᐆᒪᔪᕐᑕᐅᓗᐊᕐᓂᖏᓐᓂᒃ ᑕᑯᓐᓇᓱᒋᑦ TWG-ᑯᑦ ᐅᓐᓂᑑᑎᕕᓂᖏᑦ ᓯᕗᓪᓕᒥ.

ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ 2: ᓄᑕᐅᓯᓕᕐᓯᒪᔪᖅ ᐅᓐᓂᑑᑎ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᒥ ᑐᖕᖓᕕᒋᑦᓱᒋᑦ 1119 ᓇᓄᐃᑦ ᐅᓄᕐᓂᖏᑦ 2021-ᒥᑦ ᖃᖓᑦᑕᔫᑦᑯᑦ ᖃᐅᔨᓴᐅᑎᓂᑦ (Northrup et al. 2022).

- **ᐱᑦᔪᑎᐅᒍᓐᓇᑐᑦ:** ᑕᒪᓐᓇ ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ ᐊᑐᕐᑐᖅ ᓇᓛᒍᕐᓂᐹᓂᒃ ᑭᓱᑕᐅᒪᓂᖏᓐᓂᒃ ᓇᓄᐃᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐊᐅᓚᑦᓯᓂᓕᕆᓂᕐᒥ ᐃᓱᓕᕝᕕᖏᓐᓂ 2021-ᒥ ᖃᖓᑦᑕᔫᑦᑯᑦ ᖃᐅᔨᓴᕐᑕᐅᑎᓪᓗᒋᑦ (Northrup et al. 2022). ᑖᓐᓇ ᐅᓄᕐᓂᖓ ᐃᒥᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂ ᓇᓄᐃᑦ ᐅᓪᓗᒥ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓃᑦᑐᓂ 2021-ᒥ ᖃᖓᑦᑕᔫᑦᑯᑦ ᖃᐅᔨᓴᕐᑎᓗᒋᑦ ᑐᖕᖓᕕᓛᑦ ᓯᕿᓂᖓᓂᒥᐅᑦ ᓇᓄᐃᑦ ᑐᖕᖓᕕᖃᕐᑎᓗᒋᑦ ᐆᒪᔪᕐᓂᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᓄᓇᓕᖕᓄᑦ. ᖃᐅᔨᓴᐅᑎᓂ ᑲᑎᕐᓱᐃᒍᑎ ᓄᐃᑦᓯᕗᖅ ᐅᒥᑦᑑᔪᑦᓴᐅᓂᖓᓂᒃ ᐊᕐᕌᒍᓂ ᐊᒥᓱᓂ, ᑭᓱᐊᓂ ᖃᐅᔨᒪᓇᖕᖏᓂᖏᑦ ᓱᓕ ᐱᑕᖃᖏᓐᓇᑐᑦ. ᐊᒻᒪᓗ ᓱᓕ, ᑕᒪᓐᓇ ᐅᓄᕐᑑᓂᖏᓐᓂᒃ ᐱᐊᔅᑦ ᐆᒪᑕᐅᒋᐊᖃᖏᓐᓇᑐᑦ 2021-ᒥ ᓱᕐᔅᑎᖏᓐᓂᐊᖑᓇᓴᐅᔪᖅ ᐃᓂᖃᕐᕕᓕᑦ ᐆᒪᔪᕐᑕᐅᕈᓐᓇᓂᖏᓐᓂᒃ. ᑕᒐ ᑕᒪᓐᓇ ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ ᐅᓄᕐᓯᒋᐊᕐᓯᒪᓂᖏᓐᓂᒃ ᐃᑉᐱᒋᔭᐅᓯᒪᔪᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ 2021-ᒥ ᓴᕐᕿᑎᑦᓱᒍᑎᖃᕐᕐᑯᖅ ᐱᕈᑦᐸᓕᐊᓪᓚᑎᐅᑎᖏᓐᓂᒃ ᐅᓄᕐᓂᖏᑦᑕ 2016-2021 ᐊᕐᕌᒍᖏᓐᓂ. ᐅᓄᕐᓂᖏᑦ ᐅᓄᕐᓯᒋᐊᕐᓯᒪᔪᑦᓴᐅᔪᑦ ᐆᒪᔪᕐᑕᐅᖏᓐᓂᓴᐅᓕᕐᓂᖏᓐᓄᑦ ᐅᑦᓯᒪᓂ 2011 2016-ᓗ ᐊᕐᕌᒍᖏᓐᓂ ᐊᕐᕌᒍᐃᓪᓗ ᐱᖓᓱᑦ ᓱᑯᖃᑦᓯᐊᓂᕐᐸᕕᓂᐅᑦᓱᑎᒃ ᐊᕐᕌᒍᓂ ᕐᑯᓕᓂ ᐊᓂᒍᕐᑐᓂ 2016 2021-ᓗ ᐊᑯᓐᓂᖏᓐᓂ. ᐃᓱᒪᒋᑦᓱᒋᑦ ᑲᑎᓐᓂᖏᑦ ᐱᑕᖃᕐᓂᖏᑦᑕ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᖓᓂᒥᐅᑦ ᓯᕿᓂᐅᓪᓗ ᓂᐱᕕᐊᕐᓂ ᓄᓪᓚᖓᓚᓐᓂᓴᑦ 2016 2021-ᓗ ᐊᑯᓐᓂᖏᓐᓂ, ᐃᓱᒪᒋᐅᑦᔨᑐᐊᕈᑦᑕᓗ ᐅᓄᕐᓯᒋᐊᕐᓂᓕᕕᓂᐅᑉᐸᑕ 29%-ᓄᑦ

ᓇᓄᐃᑦ ᐱᑕᖃᕐᓂᖏᓐᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ, ᑕᒪᓐᓇ ᑐᑭᖃᕋᔭᕐᑐᖅ ᐃᑭᓪᓕᒪᓇᑦᑐᕕᓂᐅᓂᖏᓐᓂᒃ ᐊᑭᐊᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂ ᐃᓂᖃᕐᕕᓕᓐᓂ.

- **ᐊᑦᑕᓇᑐᐃᓐᓇᕆᐊᓕᒃ:** ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ 2 ᓄᐃᑦᓯᒪᑦ ᐊᑦᑕᓇᕐᓂᓴᐅᒐᓚᓐᓂᖓᓂᒃ ᐆᒪᔪᕐᑕᐅᓗᐊᖃᑦᑕᓂᖏᓐᓂᒃ ᑕᑯᓐᓇᓱᒋᑦ TWG-ᑯᑦ ᐅᓐᓂᑑᑎᕐᖃᕕᓂᖏᓐᓂᒃ ᐃᓱᒪᒋᑦᓱᒋᑦ ᐃᒣᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᐅᓗᐊᕈᑎᓕᒃ ᐱᑕᖃᕐᓂᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ.

ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ 3: ᓄᑕᐅᓯᓕᕐᓯᒪᔪᑦ ᐅᓐᓂᑑᑏᑦ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᓂ ᑐᖕᖓᕕᒋᑦᓱᒋᑦ ᐃᒣᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂ 1000-ᓂᒃ ᓇᓄᕐᓂ.

- **ᐱᑦᔪᑎᐅᒍᓐᓇᑐᑦ:** ᑖᓐᓇ ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ ᐊᑐᕐᑐᖅ ᐱᑕᖃᕐᓂᖏᑦᑕ ᐃᒣᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂᒃ ᐊᑐᕐᑕᐅᓯᖑᒻᒪᑕ ᐊᐅᓚᑦᓯᓂᓕᕆᓂᕐᒧᑦ ᐱᑦᔪᑎᖃᕐᓱᑎᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ. ᓇᓄᐃᑦ 1000 ᐱᑕᖃᕐᓂᖏᑦ ᐃᒣᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᐅᒻᒥᔪᑦ ᐊᑐᕐᑕᐅᓯᒪᑦᓱᑎᒃ ᐅᓪᓗᒥ ᐆᒪᔪᕐᓂᐅᓲᓂᒃ. ᑕᕝᕙᓂ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᖅ, ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᓇᓄᐃᑦ ᐱᑕᖃᕐᓂᖏᑦ ᓄᓪᓚᖓᒐᓚᓐᓂᓴᐅᓲᖅ ᐊᕐᕋᒍᓂ ᐊᕙᑎᓂ ᐊᓂᒍᕐᑐᓂ, ᐃᓱᒪᒋᑦᓱᒋᑦ ᐊᕐᔨᒌᖕᖏᓂᓇᓲᖏᑦ ᐱᑕᖃᕐᓂᖏᑦᑕ ᐃᒣᓪᓗᐊᕐᑰᕐᒪᑖᕈᑎᓂ. ᐊᑐᕐᓱᒋᑦ 1000 ᓇᓄᐃᑦ ᐃᓱᒪᒋᐅᑦᔨᓱᒪᕗᖅ ᐅᓄᕐᓯᒋᐊᕐᓯᒪᔪᓂᒃ ᐃᐸᐱᒋᔭᐅᓯᒪᔪᓂᒃ 2021-ᒥ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᒥ. ᐱᑦᔪᑎᖃᓚᐅᔪᖅ ᐊᐅᓚᓲᖑᓂᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓯᕿᓂᐅᑉ ᓂᐱᕕᐊᓂ ᐃᓂᖃᕐᕕᖃᓲᑦ ᓇᓄᐃᑦ ᑕᓯᔭᐅᕐᔪᐊᑉ ᓯᕿᓂᖓᓄᑦ ᐆᑦᓱᒪᓂ ᖃᐅᔨᓴᕐᑕᐅᓱᑎᒃ, ᐃᓚᖏᓪᓗ ᐱᑦᔪᑎᖃᕐᑐᓴᐅᓐᓂᒥᔪᑦ ᓄᓇᒥ ᐊᖏᓕᕝᓕᐊᓂᖓᓂᒃ ᐅᓄᕐᓂᖏᑦᑕ. ᐅᓄᕐᓯᒋᐊᖓᓚᑦᓯᒪᔪᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐱᑕᖃᕐᓂᖓ 2016 2021-ᓗ ᐊᑯᓐᓂᖏᓐᓂ ᓂᕆᐅᕐᕕᖃᕈᑕᐅᖕᖏᑐᖅ ᐆᒪᔪᕐᓂᖃᖕᖏᓂᕐᓴᐅᓂᕐᒪᑦ 2011 2016-ᓗ ᐊᑯᓐᓂᖏᓐᓂ ᐊᒻᒪᓗ ᐱᖓᓱᓂ ᐊᕐᕌᒍᓂ ᓯᑯᖃᑦᓯᐊᖏᓐᓇᑐᕕᓂᐅᓂᖓ ᐊᕐᕌᒍᓂ ᕐᑯᓕᓂ ᐊᓂᒍᕐᑐᓂ 2016 2021 ᐊᑯᓐᓂᖏᓐᓂ.

- **ᐊᑦᑕᓇᑐᐃᓐᓇᕆᐊᓕᒃ:** ᐊᑑᑎᔭᐅᒍᓐᓇᑐᖅ 3 ᓄᐃᑦᓯᔪᖅ ᐊᑦᑕᓇᑐᐃᓐᓇᕆᐊᖃᕐᓂᖏᓐᓂᒃ ᐱᔭᐅᓗᐊᑐᐊᕐᐸᑕ ᑕᓯᐅᓇᓱᒋᑦ TWG-ᑯᑦ ᐅᓐᓂᑑᑎᕐᖃᕕᓂᖏᑦ ᐃᓱᒪᒋᑦᓱᒋᑦ 1000 ᐊᓯᑦᔨᒪᑦ 895-ᓄᑦ (20%-ᖏᓐᓃᑐᖅ ᓇᓄᐃᑦ ᑕᓯᐅᔭᕐᔪᐊᒥᐅᑦ ᓯᕿᓂᖓᓂ 2021-ᒥ ᓈᑦᓯᒪᓚᐅᕐᑐᑐᕕᓂᐅᒻᒪᑕ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᑕ ᓂᐱᕕᐊᓂᑦ) ᐊᒻᒪᓗ 1119 (ᓇᓄᓕᒫᓈᖓᔪᖅ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ 2021-ᒥ ᐃᓚᒋᔭᐅᓚᐅᔪᑦᓱᒋᑦ ᓯᕿᓂᖓᓂ ᐃᓂᖃᕐᕕᓕᓐᓄᑦ). ᐊᒻᒪᓗ ᓱᓕ, 1000 ᓇᓄᐃᑦ ᑐᖕᖓᕕᐅᖃᑦᑕᓕᕐᑐᑦ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐊᒻᒪᓗ ᑕᒪᓐᓇ ᐅᓄᕐᓂᖅ ᓄᓪᓚᖓᑎᑦᓯᒍᓇᐅᑦᓱᓂ ᐅᓄᕐᓂᖏᓐᓂ ᐊᕐᕌᒍᓂ ᐊᕙᑎᓂ ᐊᓂᒍᕐᑐᓂ, ᖃᐅᔨᒪᓇᖕᖏᓂᖃᕋᓗᐊᕐᑎᓗᒋᑦ.

ᐅᓐᓂᑑᑕᐅᒍᓐᓇᓂᖏᑦ

ᐃᓱᒪᒋᑦᓱᒋᑦ ᒫᓐᓇᐅᑎᓪᓗᒍ ᖃᐅᔨᒪᓇᖕᖏᓂᖏᑦ ᐱᑕᖃᕐᓂᖏᓐᓄᓕᖓᔪᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ, TWG-ᑯᑦ ᐅᓐᓂᑑᑎᖓ 3, ᐊᑐᕐᓱᓂ ᐱᑕᖃᕐᓂᖏᓐᓂᒃ 1000-ᓂᒃ ᓱᕐᕐᑯᐃᓱᓂᕐᒧᑦ ᐃᓘᓐᓈᒍᑦ ᐆᒪᔪᕐᓃᑦ ᐅᓄᕐᓂᖏᓐᓂᒃ, ᐊᑑᑎᒐᑦᓴᓯᐊᖑᓂᕐᐸᐅᑎᓪᓗᒍ ᐃᑭᓐᓂᓴᐅᑎᑦᓯᒋᐊᕐᓂᒧᑦ ᐊᑦᑕᓇᕈᑎᐅᒍᓐᓇᑐᓂᒃ ᐆᒪᔪᕐᓂᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ (ᑕᒐ ᒐᒥᒻᒪᑦ ᒥᑭᓂᕐᓴᐅᑎᑦᓯᓱᓂ ᓈᒻᒪᖏᑦᑐᑯᑦ ᐊᓯᑦᔨᒍᑎᐅᒐᔭᕐᑐᓂᒃ ᐆᒪᔪᕐᑕᐅᕈᓐᓇᑐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓ ᓂᐱᕕᐊᓂ).

TWG-ᑯᑦ ᓱᖏᐅᑎᓴᒋᐊᓪᓛᑎᑦᓯᓂᓕᒃ ᓈᒻᒪᓂᕐᓴᓂᒃ ᐊᑦᑕᓇᕐᑐᐃᓐᓇᕆᐊᖃᖕᖏᑐᓂᒃ ᓲᓱᒋᓗᒋᑦ ᐊᐅᓚᑦᓯᓂᓕᕆᓂᒃᑯᑦ ᑐᕋᒐᓱᐊᕐᑕᐅᔪᑦ 1 ᐊᒻᒪᓗ 2 ᓴᕐᕿᑎᑕᐅᔪᓂ Regher et al. 2021-ᒥ (ᑐᕋᒐᓱᐊᕐᑕᐅᔪᖅ 1 = ᐱᑕᕐᕙᓐᓇᑎᑦᓯᓂᕐᒧᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᐅᓄᕐᓂᐸᐅᒍᓐᓇᕕᖏᒍᕐᑎᓗᒋᑦ ᕿᑐᕐᖏᐅᓂᖏᑦ; ᑐᕋᒐᓱᐊᕐᑕᐅᔪᖅ 2 = ᐱᑕᕐᕙᓐᓇᑎᑦᓯᓂᕐᒧᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ 90%-ᖏᓐᓂᒃ ᐱᒋᐊᕐᕕᖓᓐᓂ). ᐅᓐᓂᑑᑎᓂ ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑑᒥ 2-ᒥ, ᑕᒪᓐᓇ ᑐᖕᖓᕕᖃᕐᒥᔪᖅ ᐊᕐᓇᑦ ᐱᔭᐅᓂᖏᑦᑕ ᐅᓄᕐᓂᖏᓐᓂᒃ h = 0.02-0.03, ᐱᑐᑦᓯᒪᑦᓱᓂ ᐱᒋᐊᕐᕕᖓᓄᑦ ᐆᒪᔪᕐᓂᐅᕈᓐᓇᑐᑦ 10-15-ᓄᑦ ᐊᕐᓇᓄᑦ ᓇᓄᕐᓄᑦ/ᐊᕐᕌᒍᒥ. ᑕᒪᓐᓇ ᐅᓄᕐᓂᓄᑦ ᓇᓪᓕᕐᑯᐊᓕᒃ (ᐆᑦᑑᑎᒋᓗᒍ ᐊᕐᓇᑦ ᐊᖑᑏᑦ) ᐆᒪᔪᕐᓂᓂ 2.0-3% ᐃᒣᓪᓗᐊᒪᑦ 1:1 ᐊᖑᑎᒥᑦ ᐊᕐᓇᒧᑦ ᐆᒪᔪᕐᓂᓂ, ᑲᑎᓕᕋᒥᑦ ᐆᒪᔪᕐᓃᑦ 3.0-4.5% ᐃᒣᓪᓗᐊᑎᓪᓗᒋᑦ 2:1 ᐊᖑᑎᒥᑦ ᐊᕐᓇᒧᑦ. ᓴᕐᕿᑎᑦᓯᒍᑎ 1 ᓂᑦᑕᑎᑦᓯᕗᖅ ᐆᒪᔪᕐᓃᑦ ᐅᓄᕐᓂᖏᓐᓂᒃ ᐱᖓᓱᐃᓂ ᐊᑐᓂᑦ ᐱᑕᖃᕐᓂᐊᖑᓇᔭᐅᔪᓂ ᐊᑑᑎᔭᐅᒍᓐᓇᑐᓂ ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑐᖅ 2-ᒥ ᐅᓐᓂᑑᑕᐅᔪᓂ ᐊᕐᓇᑦ ᐆᒪᔪᕐᑕᐅᓂᖏᓐᓂ 0.02-0.03.

TWG-ᑯᑦ ᐅᖃᕐᒥᔪᑦ ᑐᓴᕐᑎᓯᒍᑎᓂ, Northrup et al. (2022) ᓴᕐᕿᑎᑦᓯᕗᖅ ᒫᓐᓇᐅᑎᓪᓗᒍ ᐱᑭᕐᓯᒪᑦᓯᐊᑐᓂᒃ ᖃᓄᐃᑦᑐᓴᔭᐅᓂᖏᑦᑕ ᐱᔭᐅᓲᖑᓂᖏᓐᓂᒃ ᓴᖑᔪᕕᓂᐅᒍᑎᖓ ᐊᕐᓇᓄᑦ. ᑕᕝᕙᓂ, ᓈᒻᒪᓱᐊᖕᖏᑐᑦ ᓂᑦᑕᑎᑦᓯᒍᑏᑦ ᐃᓱᓕᒍᑎᖃᕐᓂᒧᑦ ᖃᓄᐃᑦᑐᓚᓇᐅᓂᖏᓐᓄᑦ ᓇᓪᓕᐊ ᖃᓄᐃᑦᑐᓴᔭᐅᓂᖓ ᐱᔭᐅᓂᕐᓴᐅᒪᖔᑦ, ᑭᓯᐊᓂ ᐃᑉᐱᒍᓱᒋᐊᕐᑯᔨᒍᑏᑦ

ᐱᑕᓖᑦ ᐆᒪᔪᓪᓕᐊᒐᓕᒋᐊᖃᕐᓂᒧᑦ ᐊᖑᑎᓂᒃ. ᑕᒪᓐᓇ ᐃᓱᒪᒋᐅᑦᔭᐅᓯᒪᒋᐊᓕᒃ ᓱᕐᕐᑯᐃᓯᓕᕈᑎᒃ ᐆᒪᔪᕐᑕᐅᕈᓐᓇᑐᑦ ᖃᓄᐃᑦᑑᒋᐊᖃᕐᓂᖏᓐᓂᒃ (1:1 ᐅᕝᕙᓗ 2:1).

ᐅᓐᓂᑑᑎᖃᕐᒥᔪᒍᑦ ᑐᑭᑖᕐᓃᑦ ᐆᒪᔪᕐᓂᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓱᕈᓂᖓᓂ ᐃᓱᒪᒋᐅᑦᔨᒋᐊᖃᕐᒪᑕ ᐊᐅᓚᒐᔭᕐᓂᖏᓐᓂ ᓇᓄᐃᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓱᕈᓂᖓᓂ ᐊᒻᒪᓗ ᓱᕈᓂᖓᑕ ᓂᐱᕕᐊᓂ ᐃᓂᖃᕐᕕᓕᓐᓂ, ᓱᕐᒡᒍᓂᖏᓪᓗ ᓱᕐᕐᑯᐃᓯᓂᕐᒧᑦ ᐱᑕᕐᕕᓇᑎᑦᓯᒋᐊᕐᓂᒧᑦ ᐆᒪᔪᕐᓂᐅᓂᕐᒥ ᐃᓂᖃᕐᕕᖏᓐᓂ ᐊᑐᓂᑦ.

ᓴᕐᕈᑎᑦᓯᒍᑎ 1: ᐅᓐᓂᑑᑏᑦ ᐆᒪᔪᕐᓂᒥ ᖃᓄᐃᑦᑑᓂᐅᒐᔭᕐᑐᖅ 2-ᒥ Regehr et al. 2021-ᒥ, ᐃᓱᒪᒋᑦᓯᒋᑦ ᐊᕐᓂᑦ ᐱᔭᐅᓂᖏᑦ 0.02-ᒥᑦ 0.03-ᒧᑦ, ᒪᓕᑦᓯᒋᑦ ᐱᖓᓱᑦ ᐊᕐᔨᒌᖕᖏᑐᑦ ᐱᑕᖃᕐᓃᑦ ᐊᑑᑎᔭᐅᒍᓐᓇᑐᓂ, ᐊᒻᒪᓗ 0.50-ᓂᒃ ᐊᕐᓇ ᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓱᕈᓂᖓᓂ ᐃᓂᖃᕐᕕᖃᓱᓂ Regehr et al. 2021.

ᑲᑎᓕᕋᒥᑦ ᐱᑕᖃᕐᓂᐊᖑᓇᔭᐅᓂᖏᑦᑕ	ᐊᕐᓐᑦ ᐱᑕᖃᕐᓂᖏᑦ	ᑲᑎᓕᕋᒥᑦ ᐊᕐᓐᑦ ᐱᔭᐅᓂᖏᑦᑕ	ᐃᓗᓐᓈᒍᑦ ᐅᓄᕐᓂᖏᑦ ᐱᔭᐅᓂᖏᑦᑕ 2:1 ᐊᖑᑏᑦ ᐊᕐᓇᓄᑦ (ᐆᒪᔪᕐᑕᐅᓂᖏᑦᑕ ᐅᓄᕐᓂᖏᑦ)	ᐃᓗᓐᓈᒍᑦ ᐅᓄᕐᓂᖏᑦ ᐱᔭᐅᓂᖏᑦᑕ 1:1 ᐊᖑᑏᑦ ᐊᕐᓇᓄᑦ (ᐆᒪᔪᕐᑕᐅᓂᖏᑦᑕ ᐅᓄᕐᓂᖏᑦ)
Option 1: 895	448	9-14	27-42 (3.0-4.7%)	18-28 (2.0—3.1%)
Option 2: 1119	560	12-17	36-51 (3.2 – 4.6%)	24-34 (2.1 – 3.0%)
Option 3: 1000	500	10-15	30-45 (3.0 - 4.5%)	20-30 (2.0 – 3.0%)

ᓯᕗᓂᕐᒥ ᖃᐅᔨᓴᐅᑏᑦ ᐃᓱᒪᒋᐅᑦᔨᔭᐅᓂᕐᒧᑦ

ᖃᐅᔨᒪᓇᖕᖏᓂᕐᒥ ᓄᐃᑕᐅᓯᒪᔪᓂ ᖃᒻᒥᐅᓂᕐᐹᑯᑦ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᓄᑦ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓱᕈᓂᖓᓂ ᓱᕈᓂᐅᓪᓗ ᓂᐱᕕᐊᓂ, ᐱᓗᐊᕐᑐᒥᒃ ᐊᐅᓚᓂᐅᒍᓐᓇᕋᔭᕐᑐᑦ ᓇᓄᕐᓄᑦ ᑖᒃᑯᐊ ᐃᓂᖃᕐᕕᒃ ᐊᑯᓐᓂᖏᓐᓂ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓱᕈᓂᖓᓂ ᓱᕈᓂᐅᓪᓗ ᓂᐱᕕᐊᓂ ᐃᓱᓕᕝᕕᖏᓐᓂ, ᖃᐅᔨᓴᕐᑕᐅᕕᐅᔪᓂᓪᓗ ᖃᖓᑦᑕᔫᒃᑯᑦ ᓄᐃᑦᓯᓂᕐᒧᑦ ᐱᑕᖃᓪᓚᓇᓐᓂᖏᓐᓂᒃ ᐅᓄᕐᓂᖏᓐᓂᒃ ᐊᑐᓂᑦ ᖃᓄᐃᑦᑐᒥᓐᓂᐅᔪᓂ, TWG-ᑯᑦ ᐅᓐᓂᑑᑎᓖᑦ ᐃᓱᒪᒋᔭᖃᕐᓱᑎᒃ ᐱᕙᓪᓕᐊᓂᖏᓐᓂᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓱᕈᓂᖓᓂ ᓱᕈᓂᐅᓪᓗ ᓂᐱᕕᐊᓂ ᐅᓄᕐᓂᖏᓐᓃᑐᖅ (IPM), ᐊᐅᓚᑦᓯᓂᓕᓇᔨᓄᑦ ᐊᑑᑎᖃᕐᓂᐹᓂᒃ ᑐᓴᐅᒪᔭᐅᒋᐊᓕᓐᓂᒃ ᐱᖃᕐᑎᓯᒐᔭᕐᓱᓂ ᓇᐅᑦᓯᑐᕐᓂᒧᑦ ᐃᓗᓐᓈᒍᑦ ᐆᒪᔪᕐᓂᓂ ᓱᕗᓂᕐᒥ ᐊᐅᓚᑦᓯᓂᓕᓇᓂᒃᑯᑦ ᑐᑭᑖᕈᑎᑦᓴᖃᕐᓂᒧᑦ ᑕᒪᒃᑯᓄᖓ ᐃᓂᖃᕐᕕᖃᓱᓄᑦ.

ᑲᑎᕐᓱᑎᒃ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓱᕈᓂᕐᒥᐅᑦ ᓱᕈᓂᐅᓪᓗ ᓂᐱᕕᐊᓂ IPM ᐊᑐᕐᑕᐅᕈᓐᓇᑎᑦᓯᒐᔭᕐᑐᑦ ᐊᑐᐃᓐᓇᐅᔪᓂᒃ ᖃᓇᑕᐅᔭᒧᔭᕐᓯᒪᔪᓂᒃ ᖃᖓᑦᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓃᑦ ᐃᓚᐅᑎᓪᓗᒋᑦ, ᐆᒪᔪᕐᓃᑦ ᐃᐸᐱᒋᔭᐅᓂᖏᑦ, ᐱᖃᑦᑕᓃᑦ ᐅᑎᕐᑎᖃᑦᑕᓱᒋᓪᓗ ᑐᑭᓯᓴᕐᑕᐅᓂᖏᑦ, ᑎᒥᒃᑯᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᑦ ᑭᓯᑕᐅᒍᑎᖏᑦᑕᓗ ᑲᑎᕐᓱᑕᐅᒍᑎᖏᑦ. IPM ᑕᒐ ᐱᖃᕐᑎᓯᒍᑎᐅᒍᓐᓇᓕᕋᔭᕐᑐᖅ ᐱᑕᖃᕐᓂᐅᖑᓇᔭᐅᓂᖏᓐᓄᑦ ᐆᒪᒍᓐᓇᓂᖏᓐᓂ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓱᕈᓂᕐᒥᐅᑦ ᓱᕈᓂᐅᓪᓗ ᓂᐱᕕᐊᓂ ᐃᓂᖃᕐᕕᓕᓐᓂ, ᐅᓄᕐᓂᖏᓪᓗ ᑕᐅᕐᓱᖃᑦᑕᓱᖑᓂᖏᑦ ᑕᒪᕐᒥᒃ ᐃᓂᖃᕐᕕᒃ. ᐊᒻᒪᓗᒋᐊᓪᓚᖅ IPM-ᑯᑦ ᑐᓴᕐᑎᑕᐅᒍᑎᖃᕈᓐᓇᕋᔭᕐᑐᑦ ᑕᒪᖏᓐᓄᑦ ᓱᑯᐃᔪᓂᒃᑯᑦ ᑐᕐᕐᑯᑐᕐᓱᒪᔪᓄᑦ ᐊᒻᒪᓗ ᓄᓇᖃᕐᖃᓱᒪᔪᑦ ᖃᐅᔨᒪᐅᓱᖏᓐᓄᑦ (IK), ᐃᑲᔪᕐᓱᒍᓐᓇᕋᔭᕐᓱᑎᒃ ᐋᕐᕐᑮᒋᐊᕐᓂᒧᑦ ᐊᑦᔨᑏᖕᖏᒍᑎᖏᓐᓂᒃ ᓱᑯᐃᔪᓂᒃᑯᑦ ᖃᐅᔨᓴᕐᑕᐅᔪᑦ ᐊᒻᒪᓗ ᓄᓇᖃᕐᖃᓱᒪᔪᑦ ᖃᐅᔨᒪᐅᓱᖏᑦᑕ. ᑕᒪᓐᓇ ᐊᑑᑎᖃᑦᓯᐊᓂᕐᓴᐅᒐᔭᕐᑐᖅ ᓇᐅᑦᓯᑐᕐᓂᒧᑦ ᖃᓄᐃᓗᑕᑎᑦᓴᖃᕐᓂᒧᑦ ᐆᒪᔪᕈᓐᓇᓂᕐᓂ ᐊᐅᓚᑦᓯᔨᓪᓗ ᑐᓴᐅᒪᔭᐅᒋᐊᓕᓐᓂᒃ ᐱᖃᕐᑎᓗᒋᑦ ᖃᓄᐃᑦᑐᑰᒍᑎᖏᓐᓄᑦ ᓄᓇᕐᑎᒍᑦ. ᐃᓱᒪᒋᑦᓯᒋᒃ ᑖᒃᑯᐊ ᐃᓂᖃᕐᕕᒃ ᑲᑎᕐᓱᑎᒃ ᐅᓄᕐᓯᒋᐊᕐᑎᓯᒍᓐᓇᓂᖏᒃ ᓄᓪᓚᖓᓂᖏᓐᓂᒃ ᐊᐅᓚᑦᓯᓂᓕᓇᓂᕐᒥ (ᐆᑦᑑᑎᒋᓗᒍ ᐊᓯᑦᔨᒪᓇᓪᓗᐊᒐᓕᑎᑦᓯᓂᖅ ᐆᒪᔪᕐᓂᓂ ᐱᑐᑦᓯᒪᔪᓂᒃ ᐊᐅᓚᓚᐅᕐᑎᓂᖏᓐᓄᑦ ᓇᓄᐃᑦ) ᐃᓂᖃᕐᕕᓖᓪᓗ ᓱᕐᕋᐅᓪᓗᐊᖏᓐᓂᖏᓐᓄᑦ ᓈᒻᒪᖏᑦᑐᑯᑦ ᐊᐅᓚᑦᓯᓂᒃᑯᑦ ᐊᓯᐊᓂ ᐃᓂᖃᕐᕕᖓᓄᑦ.

ᖃᖓᐅᓂᖓ ᐊᑭᖓᓗ: ᐃᒻᒪᖃᐅᑦᓴᓂᒃᑯᑦ, ᐱᕙᓪᓕᐊᓂᖓ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓱᕈᓂᖓᓂ ᓱᕈᓂᐅᓪᓗ ᓂᐱᕕᐊᓂ IPM ᐊᑭᖃᕋᔭᕐᑐᓴᐅᔪᖅ 100,000-ᑖᓗᑦ (ᐃᑭᓐᓂᐹᓂᒃ) ᐊᕐᕌᒍᓐᓂ ᒪᕐᕉᓂ ᐱᓇᓱᐊᕐᓂᒥ. ᓈᒻᒪᓂᕐᑕᓖᑦ IPM-ᑯᑦ ᒫᓐᓇᐅᑎᓪᓗᒍ ᐱᕙᓪᓕᐊᓂᖓᓂ ᑕᓯᐅᔭᕐᔪᐊᒥ ᓱᕈᓂᐅᑉ ᓂᐱᕕᐊᓂ ᐃᓂᖃᕐᕕᓕᓐᓄᑦ, ᑲᑎᕐᓱᑎᓪᓗ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓱᕈᓂᖓᓂ-ᓱᕈᓂᐅᓪᓗ ᓂᐱᕕᐊᕐᓂ ᐃᓂᖃᕐᕕᓖᑦ ᑐᖕᖓᕕᖃᕋᔭᕐᓱᑎᒃ ᐱᖕᖑᑎᑕᐅᓂᖏᑦ. ᓈᒻᒪᓈᕐᑐᑯᑦ ᐃᒣᓪᓗᐊᕐᑰᕐᒪᑖᕈᑏᑦ ᖃᖓᓪᓗᐊᑎᒋᓐᓂᖓ

ᐊᑭᖏᓪᓗ ᑕᓯᐅᔭᕐᔪᐊᑉ ᓯᕿᓂᖓᓂ ᓯᕿᓂᐅᓪᓗ ᓂᐱᕕᐊᓂ IPM ᐊᑑᑎᒍᓐᓇᕋᔭᕐᓯᓂ TWG ᓄᐃᑦᓯᓯᒪᑦᓴᓕᕐᐸᑦ ᖃᐅᔨᓴᐅᑎᐅᑉ ᐋᕐᕿᓯᒪᐅᑎᖓᓂᒃ.

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