G-RAID: Assessing the incursion risk of African swine fever virus using generic risk assessment tools

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Background and objective

In recent years, generic risk assessment (RA) tools have been developed that can evaluate the incursion risk of multiple animal diseases via multiple introduction pathways. Generic RA tools typically also allow for a rapid response to emerging or re-emerging diseases.

In this study, generic RA tools were to answer the same risk question using three scenarios. The objective was to compare the results and explore the opportunity to cross-validate the models.

Scenarios assessed by the tools

The seven RA tools were used to assess the incursion risk of African swine fever for the Netherlands and Finland. Three scenarios were considered:
A) The baseline scenario: actual disease situation in Europe in 2017,
B) Scenario A + ten cases of ASF in wild boars in Germany, and
C) Scenario B + one outbreak of ASF on a pig farm in Germany.
For comparison of the models, relative risks between the Netherlands and Finland and relative risks between selected pathways in scenarios were assessed.
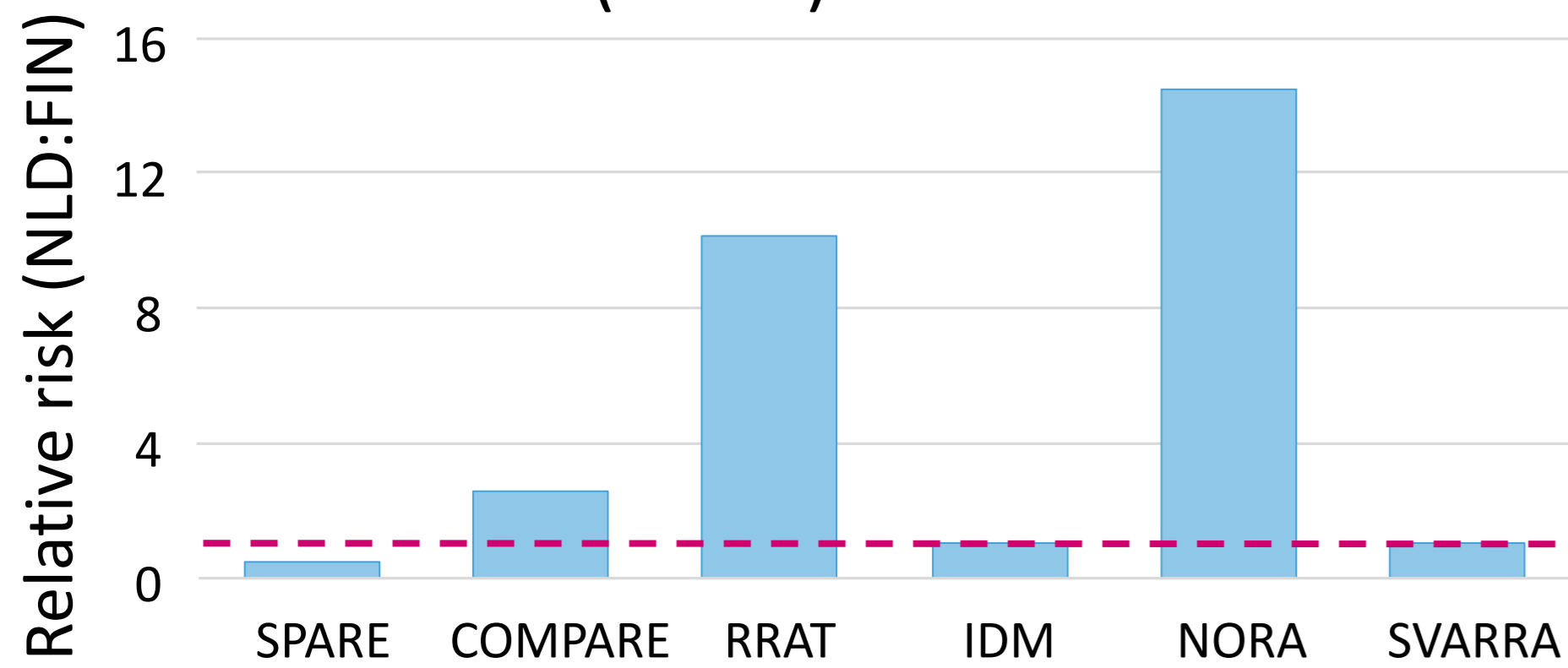
Live Animals: Risk higher for the Netherlands than for Finland
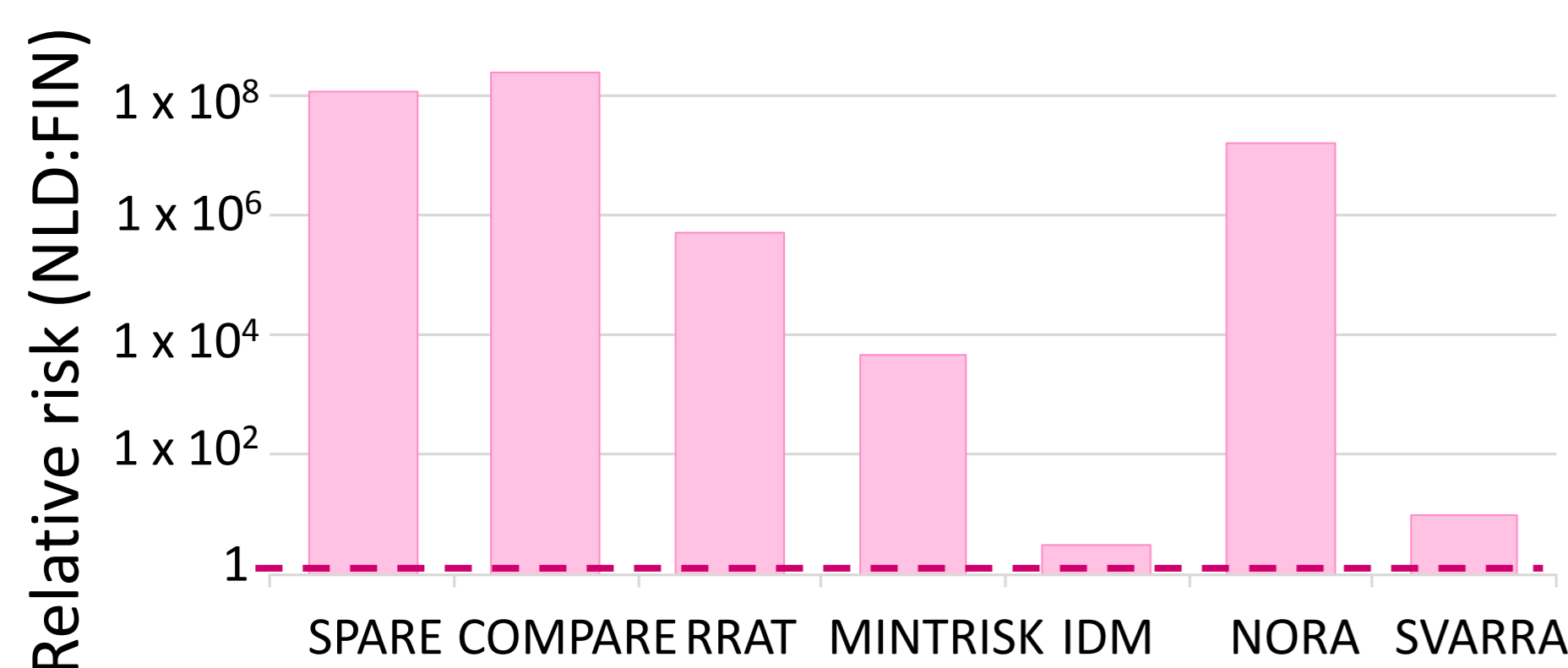
Animal Products: Risk higher for the Netherlands than for Finland (3 tools), equal (2 tools) or lower (1 tool)

Wild Boar: Risk higher for Finland than for the Netherlands (4 tools) or equal (2 tools)
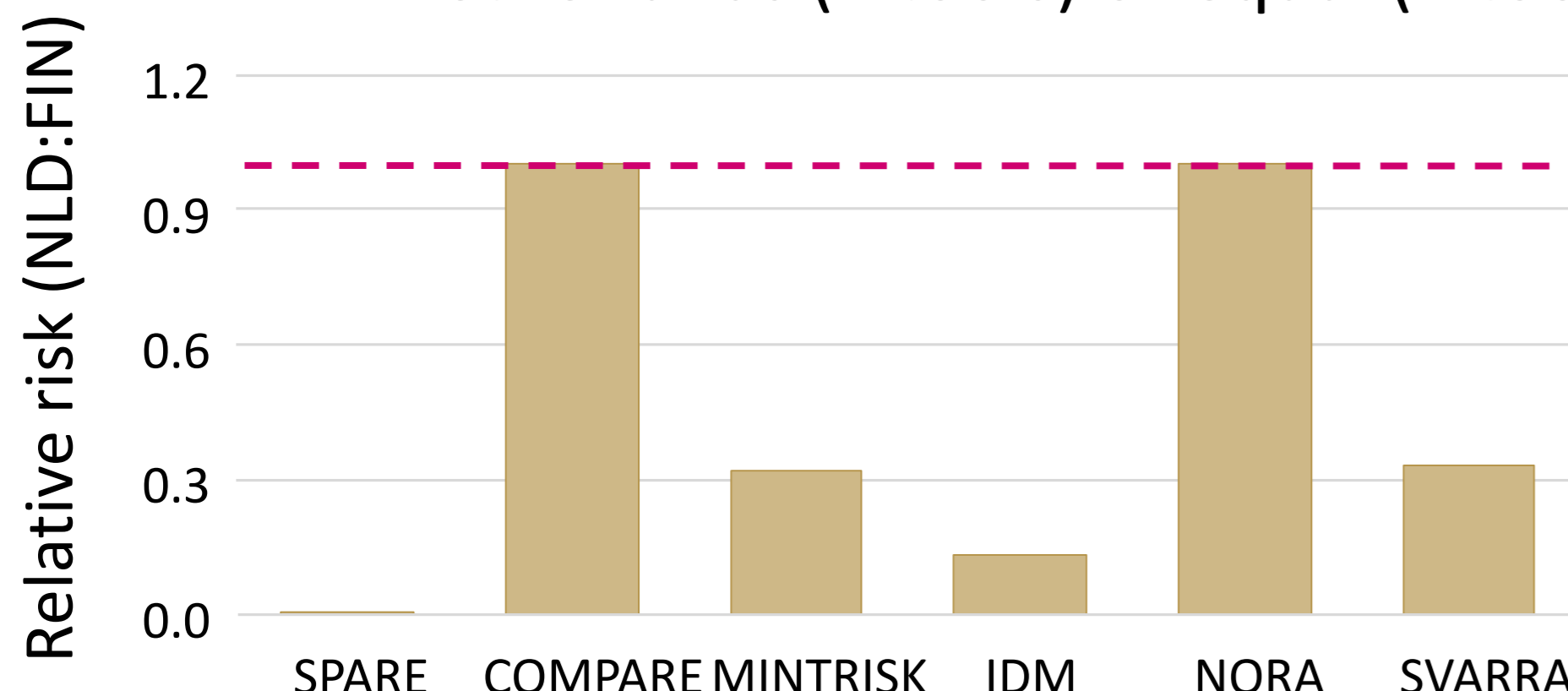

Figure 1. *Relative risk of introducing African swine fever into the Netherlands compared to Finland by trade in live animals, trade in animal products, and movement of wild boar in the baseline scenario (Scenario A).*
A relative risk of 1 (– – – –) denotes equal risk for both countries.

Summary

The generic RA tools were developed for different purposes ranging from response to new outbreaks to horizon scanning.

A comparison of *absolute results* was not possible because of different endpoints and output parameters (**Table1**).

A comparison of *relative results* indicated that **the RA tools mostly agreed** on differences in the ASF incursion risk for the Netherlands and Finland (**Figure 1.**), and on changes in the risk due to presence of ASF in Germany in hypothetical scenarios (**Figure 2.**).

The cross-validation contributed to the credibility of the results of the generic RA tools evaluated

The Netherlands: Risk increases in nearly all tools and pathways, considerably in some.
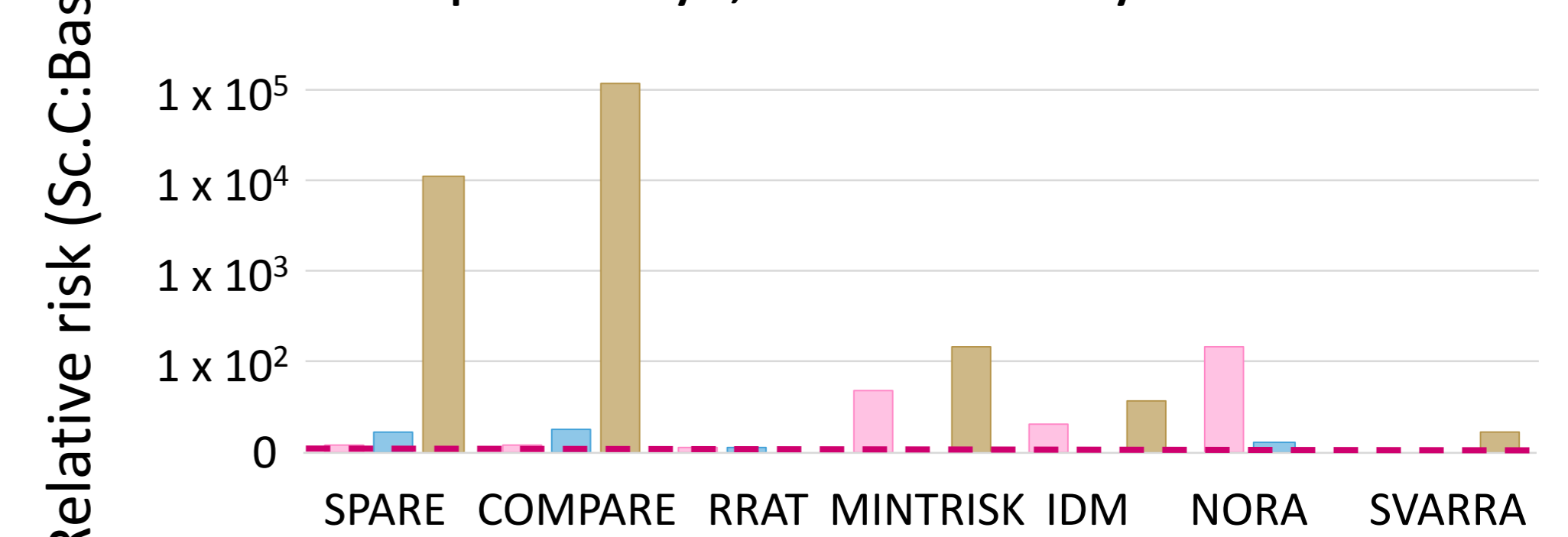
Finland: Risk mostly increases little or not at all.
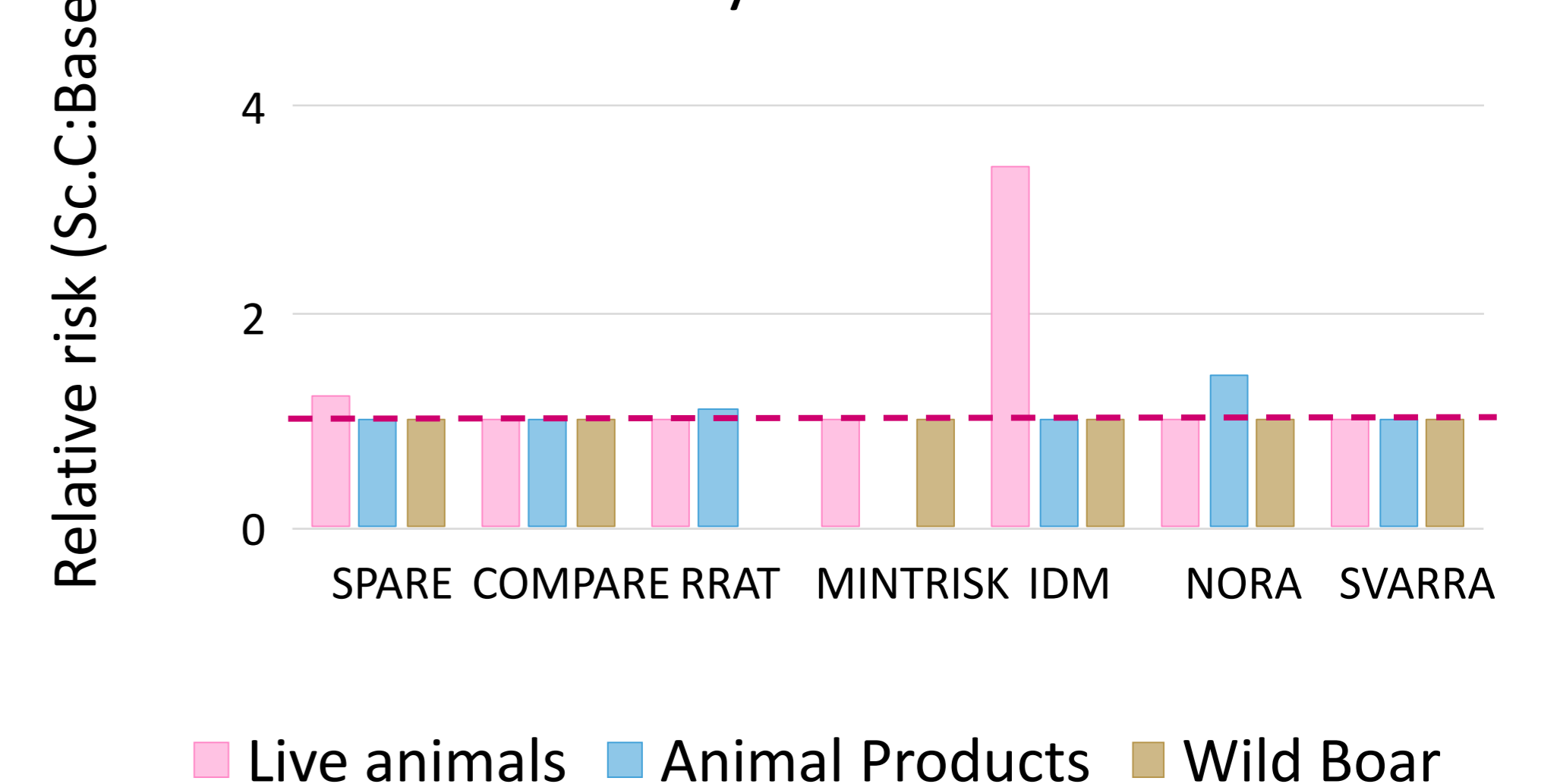

■ Live animals ■ Animal Products ■ Wild Boar

Figure 2. *Relative risk of introducing African swine fever into the Netherlands and Finland via selected pathways in the hypothetical scenario with ASF reported in wild boar and domestic pigs in Germany (Scenario C) compared to the baseline scenario (Scenario A).*
A relative risk of 1 (– – – –) denotes no increased risk compared to the baseline scenario (Scenario A).

Table 1. *Characteristics of the seven generic risk assessment tools*

TOOL	TYPE	Endpoint	Output parameter
SPARE[2]	Quantitative	Entry	Number per year
COMPARE[2]	Quantitative	First infection	Annual probability
IDM[2,3]	Semi-quantitative	Exposure	Risk score, translated into qualitative risk category
MINTRISK[1]	Semi-quantitative	First infection	Annual rate, translated into risk score between 0 and 1
RRAT[1]	Semi-quantitative	First infection	Probability-based risk score between 0 and 1
NORA[5]	Semi-quantitative	First infection	Risk score, translated into qualitative risk category
SVARRA[4]	Qualitative	Exposure	Qualitative risk category