

Title: Removal of Pre-Movement Testing exemption for movements within a Sole Occupancy Authority (SOA) situated entirely in the annual TB surveillance testing area IA No: DEFRA1788 Lead department or agency: Defra Other departments or agencies:	Impact Assessment (IA)		
	Date: 01/08/2014		
	Stage: Validation IA		
	Source of intervention: Domestic		
	Type of measure: Secondary legislation		
Contact for enquiries: comms.tb@DEFRA.GSI.GOV.UK			
Summary: Intervention and Options		RPC Opinion: Validated	

Cost of Preferred (or more likely) Option			
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB on 2009 prices)	In scope of One-In, Two-Out?
-£1.02m	-£1.31m	£0.12m	Yes
			Measure qualifies as IN

What is the problem under consideration? Why is government intervention necessary?

Under Defra's TB pre-movement testing (PrMT) policy, cattle moved from higher TB risk herds must be tested with negative results before being moved. There are a small number of exempted movements, one of which – movements between separate holdings under the same ownership (Single Occupancy Authority - SOAs) - represents a disease risk. The spread of disease between herds and into wildlife is an externality where the actions of one farmer with disease can lead to negative spill-overs and costs to other farmers as well as to the taxpayer. Requiring cattle keepers to test their animals prior to moves between holdings, and preventing those moves where disease is found, reduces this externality.

What are the policy objectives and the intended effects?

The intended effects are to find disease earlier via pre-movement testing and prevent onward spread. This will avoid future disease control costs to both farm businesses (testing costs, economic losses of infected cattle that are slaughtered and movement restrictions) and taxpayers (testing costs, compensation payments, administration).

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

Option 1 – Removal of pre-movement testing exemption for cattle moved within SOAs that are solely in the annually tested area (High Risk Area (HRA) and Edge Area) of England. Moves within 10 miles of the holding's main site to be licensed without pre-movement testing. This is the preferred option.

Previous experience with a non-mandatory approach to pre-movement testing suggests that farmers are unlikely to do so voluntarily. Before 2006 owners of cattle herds in the high TB risk areas were urged to pre-movement test their stock – but farmers very rarely did so.

Will the policy be reviewed? It will be reviewed. If applicable, set review date: 07/2018					
Does implementation go beyond minimum EU requirements?				No	
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.		Micro Yes	< 20 Yes	Small Yes	Medium Yes
What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent)				Traded: N/A	Non-traded: N/A

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible SELECT SIGNATORY: _____ **George Eustice** _____ Date: _____ **2nd September 2014** _____

Summary: Analysis & Evidence

Policy Option 1

Description:

FULL ECONOMIC ASSESSMENT

Price Base Year 2013	PV Base Year 2014	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -£1.94m	High: -£0.1m	Best Estimate: -£1.02m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A	£0.12m	£1.07m
High	N/A	£0.24m	£2.07m
Best Estimate		£0.18m	£1.57m

Description and scale of key monetised costs by 'main affected groups'

Costs to business would include vet fees, farmer time for gathering and presenting animals and any impact of productivity (see annex for full details). These figures give us the range of costs shown above with the central estimates of £300 per business and **£182k per year** for all businesses.

Other key non-monetised costs by 'main affected groups'

The costs to Government of increased tuberculin and enforcement of policy are not taken into account.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	£0.02m	£0.13m
High	N/A	£0.11m	£0.97m
Best Estimate		£0.06m	£0.55m

Description and scale of key monetised benefits by 'main affected groups'

Within-herd benefits to businesses that will carry out pre-movement testing (**£16k** to business in avoided economic loss and **£15k** to Government avoiding compensation and slaughter); and between-herd-benefits to farmers local to where cattle are moved to (**£14k** to business and **£19k** to Government in avoided control costs – compensation, admin, testing etc.), totalling **£64k**.

Other key non-monetised benefits by 'main affected groups'

Reduced stress of operating businesses under restrictions as well as the emotional impact of losing valued cattle.

Key assumptions/sensitivities/risks

The number of animal moves and the costs of testing may also vary alongside the amount of disease actually found. The future level of TB over time is assumed to be flat. See table 10.

Discount rate (%)

3.5

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OITO?	Measure qualifies as
Costs: 0.1	Benefits: 0.0	Net: -0.1	Yes	IN

Evidence Base (for summary sheets)

1. The policy issue and rationale for Government intervention

Bovine TB is a serious infectious and zoonotic disease of cattle. TB related controls cost Defra in the region of £100 million a year and are increasing. TB costs to farmers in England are estimated to be in the region of £75 million a year. In 2013, almost 6.2 million cattle were tested for TB resulting in 3,900 new herd TB incidents, 5,200 herds under restriction and the slaughter of 26,600 animals¹.

The spread of disease between herds and into wildlife is an externality where the actions of one farmer with disease can lead to negative spill-overs and costs to other farmers as well as to the tax payer. Requiring cattle keepers in annually tested areas to test their animals prior to moves, and preventing those moves where disease is found, reduces this externality.

Under Defra's TB pre-movement testing (PrMT) policy cattle moved from higher TB risk herds must be tested disease free before being moved. There are a small number of exempted movements one of which – movements between separate agricultural holdings under the same ownership (Single Occupancy Authorities or 'SOAs') – represents a disease risk. Potentially infected animals could spread disease over long distances in the annually tested area of England², which potentially increases the TB risks for other cattle farmers, including the 40% of herds that have not had a TB breakdown in the last 10 years.

SOAs were created in 2003 and allow livestock keepers to link different premises, which fall under their sole management and control. There is no distance limit set for holdings within the same SOA. In the past, once the SOA was approved, livestock movements between the premises no longer incurred standstills (standing restrictions on the movements of livestock introduced in the aftermath of the 2001 outbreak of foot and mouth disease). Whenever cattle, sheep, goats or pigs are moved onto a farm, no cattle, sheep or goats may move off for a period of six days. Establishing SOAs therefore reduced burdens associated with movement standstills.

Although the PrMT exemption has been removed for movements between different parts of SOAs spanning different TB risk areas SOA operators can still move cattle over long distances, without a pre-movement test, if all their holdings are in the annually tested area. This potentially increases the TB risks for other cattle farmers, including those who are Officially TB Free (OTF) in the annual testing area.

When a cattle herd is found to have TB it loses its Officially TB Free status and undergoes a series of disease control measures until disease-freedom is regained. This is known as a 'TB breakdown'. In 2012-13 there were 215 TB breakdowns amongst 169 SOAs with links more than 10 miles apart³. Defra statisticians advise that data show a higher rate of breakdowns amongst holdings which are part of a SOA than those which are not (0.31 per holding vs. 0.17 per holding) and higher still in those with holdings more than 10 miles apart (0.42). It is hoped that this policy will reduce the size and cost of these breakdowns to industry and Government.

The Government has also committed to making a change to the exemption as part of our EU-approved TB Eradication Plan, which attracts co-financing of £12m annually for England towards Government-related TB compensation and testing costs.

2. Policy objectives and intended effects

Defra has committed to introduce measures to tackle TB in cattle. This includes removing PrMT exemptions for intra-SOA moves, which based on veterinary advice, increases disease risks.

Tightening up the PrMT testing policy will, we believe, benefit cattle farmers and the taxpayer by helping to stop further spread of the disease. This is the case particularly *within* herds by increasing the prospects for earliest detection of TB and reducing the costs to taxpayers of compensation.

Intended effects are to find disease earlier via pre-movement testing and prevent onward spread. This will avoid future disease control costs to both farm businesses (testing costs, economic losses of infected cattle that are slaughtered and movement restrictions) and taxpayers (testing costs, compensation payments, administration).

¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/318717/bovinetb-dataset-11jun14.xls

² This covers the counties of Avon, Berkshire, Buckinghamshire, Cheshire, Cornwall, Devon, Dorset, East Sussex, Gloucestershire, Hampshire, Hereford and Worcester, Leicestershire, Oxfordshire, Northamptonshire, Nottinghamshire, Shropshire, Somerset, Staffordshire, Warwickshire, West Midlands and Wiltshire.

³ SAM data 2012-13

3. Policy options considered, including alternatives to regulation

Option 1 – Removal of pre-movement testing exemption for cattle moved within SOAs that are solely in the annually tested area (HRA and Edge Area) of England. Moves within 10 miles of the holding’s main site to be licensed without pre-movement testing. This is the preferred option.

Previous experience with a non-mandatory approach to pre-movement testing suggests that farmers are unlikely to do so voluntarily. Before 2006 owners of cattle herds in the high TB risk areas were urged to pre-movement test their stock – but farmers very rarely did so.

4. Application and scope

TB control is a devolved matter. These changes will apply to England only (Wales have applied a similar measure).

5. Updates from consultation

During the consultation with industry and the public, no responses related to the content of the economic assessment; therefore no changes have been made on its content.

6. Costs

In order to establish the costs to business, the following needs to be estimated: 1. number of affected businesses; 2. number of animals moved and tested per business; and, 3. testing costs per animal.

1. Number of businesses affected

In 2012/13, there were an estimated 8,500 SOAs with cattle in the annually tested areas of England⁴. It is estimated that 550 of these SOAs had premises more than 10 miles apart⁵.

2. Number of animals moved and tested per business

There is uncertainty over the number of animals moved per business as we strongly suspect that farmers rarely record intra SOA movements. We estimate the number of moves within the SOAs in question based upon recorded intra-SOA moves for a calendar year (2012/13)⁶ as a guide for the potential moves each SOA may make in a year. Data set 1 includes all recorded intra-SOA moves for England and Wales, whilst data set 2 excludes those SOAs that moved greater than 100 animals in a single move, as these are likely short-distance moves that would not be affected by the proposal.

Table 1 – SOA movements, cattle numbers and batch data 2012/13.

	England and Wales recorded intra-SOA moves 1	England and Wales recorded intra-SOA moves 2
Number of SOAs	302	290
Number of movements	663	651
Number of cattle moved	13,290	9,051
Average animals moved per batch	20	14
Average number of animals moved per SOA	44	31

We determine the numbers moved and tested per affected business by applying these average moves per business to the total number of SOAs affected by this proposal. This results in between 17,200 and 24,200 intra-SOA animal moves per year for 550 SOAs more than 10 miles apart.

Moves within 60 days of a clear test will not require a further pre-movement test. Given herds in the annually tested area are on annual surveillance testing, a proportion will likely be covered by these⁷. Therefore, we estimate the total number of animals requiring a pre-movement test could be approx 14,300 to 20,200 per year.

⁴ Data from Defra’s Rapid Analysis and Detection of Animal-Related Risks (RADAR) database Nov 12 – Oct 13.

⁵ The 10-mile distance referred to in this assessment is the distance between the main holding and any of the links

⁶ 1 years’ data is considered representative of future years as movements data tend to be stable through time and no major incidents (e.g. disease outbreaks in 2012/13) which would dramatically affect cattle movements.

⁷ This is calculated assuming that movements are allowed up to 60 days after a clear test. 60 days is 16% of a year thus this many animals could have been routinely tested within the last 60 days.

3. Cost to business of testing

Costs of pre-movement testing include vet fees, farmer cost in terms of time for gathering and presenting animals and any impact on productivity⁸. These are estimated on a per cattle basis using estimates in the PrMT Review (2010)⁹. Note that movements within 10 miles shall be made under a general licence from AHVLA, rather than farmers being required to acquire individual licences for each move. Therefore, we do not envisage any licensing costs.

Costs will vary depending upon the number of animals tested (numbers moved in a batch) as economies of scale create lower costs per animal for the largest batches.

The estimated batch size is taken from the data on all recorded intra-SOA moves for England and Wales in 2012/13 (table 1). Estimated batch size is therefore 14 to 20.

Costs per animal range between approx £9 and £12 (see PrMT Review 2010¹⁰). Costs for all cattle tested are quantified by multiplying the number of animals tested by the cost per animal (based on batch size and labour). These range £124k to £240k (tables 2 & 3 and annex table A.7). The central estimate for annual gross costs to business is approx £182k, cost per business is £0.3k.

Table 2 – Pre-movement testing exemption for >10 mile SOAs costs (see table 10 for sources).

Cost summary	SOAs > 10 miles		
Yearly	Low	Central ¹¹	High
Cost per business	£0.2k	£0.3k	£0.4k
Cost to all businesses	£124k	£182k	£240k

Table 3 – Pre-movement testing exemption for >10 mile SOAs assumptions & costs (price year 2013) (see tables 10 for sources).

SOA data	SOAs >10 miles subset 1		SOAs >10 miles subset 2	
Number of SOAs	550	550	550	550
Sample number of recorded intra-SOA animal moves	13290	13290	9051	9051
Sample number of premises recording intra-SOA moves	302	302	290	290
Sample number of movements	663	663	651	651
Average number of animals moved per SOA	44	44	31	31
Average animals moved per batch	20	14	20	14
Total number of assumed intra-SOA moves (# SOAs x average number of movements per business)	24204	24204	17166	17166
Proportion of cattle not covered by recent routine test	84%	84%	84%	84%
Total number of animals pre-movement tested	20225	20225	14344	14344
	Low	High	Low	High
Assumed batch size per move	20	14	20	14
Vet fee per animal moved	£5.43	£8.69	£5.43	£8.69
Labour cost per animal	£3.20		£3.20	
Total cost to all businesses	£174,543	£240,427	£123,789	£170,515
Total cost per business	£317	£437	£225	£310

⁸ The farmer cost is inflated by 30% to account for non-wage costs and adjusted to 2013 prices.

⁹ <http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/pre-movement-testing-review.pdf>

¹⁰ <http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/pre-movement-testing-review.pdf>

¹¹ Note that this is the middle (median) estimate between our low and high scenarios.

7. Unquantified costs

Note that there may also be some familiarisation costs to businesses; these are assumed to be negligible. This is due to herd owners having had much experience of TB testing. Their herds are tested annually and their stock must be pre-movement tested if moved/sold to a new farm. The tuberculin cost to Government and potential enforcement costs are also not quantified.

8. Benefits to business

- Overview

The purpose of this policy is to prevent disease spread within and between cattle herds and avoid the associated control costs to government and economic losses to farmers.

By enforcing those SOAs who move animals more than 10 miles between holdings to pre-movement test animals, compared to the baseline (no testing); it is more likely that any infected animals will be found. This practise will help to stop the spread of TB within and between herds, reducing the costs of TB controls.

- Within-herd benefits

Within-herd benefits accrue from avoiding disease spread within herds that undergo pre-movement testing, and reducing the number of animals slaughtered for TB when disease is revealed.

Where infected cattle are moved within SOAs they could pass on infection to other cattle within the herd. When disease is disclosed, for example at the next surveillance test, infected cattle will be slaughtered costing farmers economic losses and taxpayers by way of compensation paid. Where PrMT discloses disease early these costs may be avoided.

Based on data from the Veterinary Risk Assessment (2012) between 2005 and 2011¹², it is estimated that of the 14,200 to 20,200 cattle moved between 550 SOAs per annum, 19 to 65 of these would be infected. Given the sensitivity of TB testing only 13 to 46 of these would be expected to be revealed (70%).

To estimate how many cattle these infected animals could infect under 'business as usual' we must consider: 1. at what point disease would likely be revealed; 2. what proportion of the animals would remain on the farm and; 3. the within-herd transmission rate of TB:

1. Given all herds in scope of this policy are on annual surveillance testing it is reasonable to assume that, on average, disease would be found after 6 months during the next surveillance test (12 month intervals, 6 months on average).
2. Analysis of cattle movement data by Defra statisticians estimates that, on average, 16% of cattle moved within SOAs will have left the SOA 6 months later; either to slaughter or onto another holding i.e. 84% remaining on holding.
3. Using the Conlan et al SOR model¹³ we estimate that for the average herd size of 133¹⁴ the number of cattle that each TB animal would infect per year is 0.7. Therefore the number of additional infected animals avoided is:

$$13 \text{ to } 46 \text{ animals} \times 84\% \text{ remaining on holding} \times 0.7 = 8 \text{ to } 27 \text{ animals}$$

Therefore, requiring all intra-SOA cattle movements (beyond 10 miles) to undergo PrMT would prevent around 18 additional animals (central estimate) becoming infected per year.

Based on work carried out by Reading University it is estimated that each cattle slaughtered due to TB, costs a farmer on average, £916 in production losses and replacement costs after taxpayer compensation is received^{15,16}. Therefore the benefit to farmers is £16k for 18 animals per year.

¹² The VRA reports that between 1st September 2005 and 30th March 2011, there were 1,729,444 PrMTs in England, finding 1,781 reactors and 2,448 inconclusive reactors. Further, PrMT review Phase 1 (2010, p.51) argues that 20% of IRs were slaughtered as reactors. This can be used to derive the probability of infection at 0.00131 (low estimate: $[1,781/1,729,444 + (1,729,444 \times 0.2) = 0.00131]$). Given Defra stats analysis within SOAs, these holdings are 2.5 times more likely to see infection the upper estimate of probability of infection being 0.00324 (2.5×0.00131).

¹³ Conlan et al. 2012 Estimating the hidden burden of bovine tuberculosis in Great Britain <http://www.ncbi.nlm.nih.gov/pubmed/23093923>

¹⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/269740/structure-june-Englandsizedbands-07jan14.xls

¹⁵ Defra Project SE3112, Reading University 2004 *Assessment of the economic impacts of TB and alternative control policies* www2.defra.gov.uk/research/Project_Data/More.asp?I=SE3112&M=KWS&V=se3112&SUBMIT1=Search&SCOPE=0

¹⁶ AHVLA SAM Compensation data 2013

Taxpayers benefit from avoided compensation payments net of any salvage received, as well as avoided haulage, disposal and slaughter costs. These are valued at £852 per animal, on average, taken from AHVLA accounts data for 2012/13. Total taxpayer benefit is therefore £15k per year. The total within-herd benefit is therefore £16k + £15k = £31k per year (table 4).

Table 4 – Within-herd benefits yearly (range of estimates) of PrMT SOAs >10miles

Within herd benefits - central	Low	Central	High
Farmer	£7k	£16k	£25k
Government	£7k	£15k	£23k
Total	£14k	£31k	£48k

See annex table A.8 for a summary of the assumptions.

- Between-herd benefits

Between-herd benefits accrue from avoiding the risk of disease spreading between herds where animals are moved into new areas of the annually tested area of England. This is particularly important where animals are moved into relatively disease-free areas. Where PrMT reveals disease and prevents animals from moving, this will also reduce the risk of disease spilling into local wildlife and neighbouring farms, avoiding disease control costs to government and farmers.

According to the pre-movement testing Regulatory Impact Assessment (2005)¹⁷ there is a small chance (2%) that moving infected animals into new areas could lead to a 'controlled hotspot'. This is where disease spills over into around 4 neighbouring herds with associated disease control costs. There is also a very small risk (0.01%) that this could result in an 'uncontrolled hotspot' where 100 herds are affected.

- Costs of a breakdown

When a cattle herd is found to have TB it loses its Officially TB Free status and undergoes a series of disease control measures until disease-freedom is regained. This is known as a 'TB breakdown'. The main control actions involve restricting movements of cattle from the herd, whole herd testing of the cattle, slaughter of any cattle that react to the test and repeated testing and slaughter until the herd is cleared. The costs of confirmed new incidents under "business as usual" can be calculated by multiplying the number of incidents in an area by the unit cost of a typical incident. The cost of a breakdown is estimated to be on average £26k (table 5).

Table 5 – Average cost of a confirmed new incident (breakdown) of bovine TB in cattle (see table 10 for sources).

Cost	Average units	Government	Farmer	Total
Slaughter (inc. haulage)	8.4 animals	£8k	£8k	£16k
Movement restrictions	133 animals x 316 days		£0.2k	£0.2k
Isolation	8.4 animals x 16 days		£0.2k	£0.2k
Testing (inc. vet fee, admin, OH, tuberculin)	133 animals x 4.43 tests	£5k	£2k	£7k
Additional tests (inc. vet fee, admin, OH, tuberculin)	210 animals	£2k	£1k	£3k
Total		£15k	£11k	£26k

Controlled hotspot cost = £26k x 4 herds = £104k

Uncontrolled hotspot cost = £26k x 100 herds = £2.6m

It is difficult to assess how many infected animals moved across the annually tested areas could lead to controlled or uncontrolled hotspots - given the different incidence of disease and role of wildlife in TB breakdowns in different areas. As a lower estimate we consider only those moves into the edge area¹⁸ where disease levels and infection

¹⁷ <http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/prmt-regulatory.pdf>

¹⁸ The Edge Area is the buffer zone between the HRA and the Low Risk Area (LRA) which contains local disease fronts advancing from the HRA towards the LRA. The incidence of bTB in the Edge Area is much lower than that in the HRA, but higher than that in the LRA. Additional evidence is needed to determine the respective role of cattle and wildlife in the spread of the disease in the Edge Area.

pressure are lower. An upper estimate is that all moves greater than 10 miles (all moves covered by this policy change) could risk creating a controlled or uncontrolled hotspot. (See annex tables A.7 & A.8 for lower/upper estimate summaries).

Analysis by Defra statisticians estimates that 59 SOAs straddle the HRA and Edge Area of the annually tested areas of England. Based on the movement data and accounting for the fact that each SOA straddling the areas may make 50% of their moves in and 50% out of the edge area, we estimate that 921 to 1,298 animals move into the edge area untested per year.

Using the same method as before, we estimate that PrMT could prevent the movement of around 1 to 3 infected animals into the edge area per year.

$$(921 \text{ to } 1,298) \times (0.00131 \text{ to } 0.00324)^{19} \times 70\%^{20} \times 0.93^{21} = 1 \text{ to } 3 \text{ animals}$$

The upper estimate assumes that rather than 921 to 1,298 animals moving into the edge area are susceptible to creating hotspots, that all the 14,200 to 20,200 animals moved risk causing hotspots. Based on this assumption, we estimate around 12 to 42 animals are prevented from causing hotspots.

$$(14,200 \text{ to } 20,200) \times (0.00131 \text{ to } 0.00324) \times 70\% \times 0.93 = 12 \text{ to } 42 \text{ animals}$$

Combining the number of prevented moves (1 to 42) with the probability of controlled and uncontrolled hotspots and their respective costs provides estimates of the between-herd benefits of this policy (table 6).

Table 6 – Controlled/uncontrolled hotspot prevention benefits

Between-herd benefits		Animal moves	Probability of hotspot	Cost per hotspot	Total yearly cost (avoided)
Controlled	Low	1	2%	£104k	£1.6k
	High	42	2%	£104k	£57.0k
Uncontrolled	Low	1	0.01%	£2.6m	£0.02k
	High	42	0.01%	£2.6m	£7.1k

Summing the low and high benefits gives us £1.62k and £64.1k between-herd benefits respectively (annex tables A.1). The central estimate is the median of these figures (table 7).

Table 7 –Between-herd yearly benefits central estimate summary

Between herd benefits - central	Low	Central	High
Farmer	£1k	£14k	£26k
Government	£1k	£19k	£38k
Total	£2k	£33k	£64k

The total benefits are split between farmers and taxpayers with high and low estimates for within and between herds (annex table A.5). Table 8 shows the central estimates of within and between herd benefits.

Table 8 – Within-herd & between-herd yearly benefits central estimate summary

Total benefit central	Farmer	Taxpayer	Total
Within-herd	£16k	£15k	£31k
Between-herd	£14k	£19k	£33k
Total	£30k	£34k	£64k

9. Unquantified benefits

Cattle farmers would face reduced stress of operating businesses under restrictions as well as the emotional impact of losing valued cattle. Without significant evidence in this area, these benefits are not taken into account in this assessment.

¹⁹ Range of probability of infection (see footnote 10).

²⁰ Proportion of reactors found by PrMT.

²¹ Note that a batch factor (0.93) is also applied; to account for the idea that animals could move to the same farm resulting in over counting of new incidents (see table 12).

10. Cost benefit analysis

TB levels have risen over the last 20 years, but the latest statistics suggest a slowing and potential flat lining of the disease²². This is likely to be caused by recent controls that have been introduced. Therefore without any robust evidence of future levels of TB, this analysis assumes a constant level of disease over the next 10 years.

Cost-benefit analysis shows us that the policy is likely to impose a small net cost to business of around £152k per year (table 9). Defra veterinary advice is that this measure must be introduced to reduce the potential risks of movements between SOAs more than 10 miles apart without pre-movement testing.

Table 9– Net benefit to business (central estimate) PrMT SOAs > 10 miles

Net benefit to business – central	Yearly	10 year present value
Cost	£182k	£1.6m
Benefit	£30k	£0.3m
Net benefit	-£152k	-£1.3m

For the purposes of sensitivity analysis we use the net benefits of the low and high estimates. The low net benefit scenario sees high costs and low benefits; £232k a year net cost to business (table A.2). The high net benefit scenario sees low costs and high benefits; £72k a year net cost to business (table A.3).

When taking into account Government benefits the net cost ranges from £11k to £225k per year, with the central figure at £118k per year (tables A.4 – A.6).

11. Risks & uncertainties

Future levels of TB in cattle and wildlife are uncertain; it is also suspected that not all SOAs report movements. Due to an unclear record of SOA movements a number of assumptions underpin the estimation of the number of intra-SOA moves; these are based on 2 subsets of SOA movement data. If the incidence of TB changes alongside the true number of moves then the costs and benefits of this policy will also change.

12. Assumptions & references

Table 10 – Summary of assumptions made

Description	Assumption	Source
Number of SOAs in England	8500	RADAR Defra database 2012-13
Number of SOAs with holdings > 10 miles apart	550	RADAR Defra database 2012-13
Sample number of recorded intra-SOA animal moves	9,051 – 13,290	RADAR Defra database 2012-13
Range of intra SOA moves	17,200 – 24,200	Estimation of number of SOA moves using recorded moves.
Range of moves needing a test	14,300 – 20,200	Calculated (movements allowed up to 60 days after a test (16% of a year) – 84% of moves need a test)
Batch size range	14 – 20	RADAR Defra database 2012-13
Vet fee range per animal moved (2013 prices)	£5 - £9	According to batch size, taken from: Pre-movement testing review, table 14 (2010) http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/pre-movement-testing-review.pdf
Labour cost per animal (2013 prices)	£3	Pre-movement testing review, table 14 (2010) http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/pre-movement-testing-review.pdf
Testing cost per animal	£9 - £12	Vet fee + labour cost

²² <https://www.gov.uk/government/collections/bovine-tb>

Cattle herd average herd size (2012)	133	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/269740/structure-june-Englandsizedbands-07jan14.xls
Cattle herd average number of animals slaughtered per case	8.4	http://www.defra.gov.uk/ahvla-en/files/pub-survreport-tb12e.pdf
Number of animals traced after new incident	210	http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/bovine-tb-impact-assessment.pdf
Whole herd test events per herd on average per TB breakdown	4.43	http://www.defra.gov.uk/ahvla-en/files/pub-survreport-tb12e.pdf
Compensation per animal on average	£1189	Sam data (2013)
Gross economic loss per animal	£2104	Reading Survey (2004) inflated
Net economic loss per animal	£916	Gross economic loss – compensation
Haulage, disposal & slaughter costs per animal	£81	Government costs 2012 inflated
Average salvage received per reactor	£337	Sam data (2013)
Net cost to taxpayer of slaughter	£933	(Compensation + slaughter) - salvage
Isolation cost per animal/16 day average isolation	£23	Reading Survey (2004) inflated www2.defra.gov.uk/research/Project_Data/More.asp?l=SE3112&M=KWS&V=se3112&SUBMIT1=Search&SCOPE=0
Testing fee per animal (vet fees, T&S, admin, overheads)	£5.32	AHVLA SAM data 2013
Tuberculin per animal	£0.33	AHVLA SAM data 2013
Movement restrictions cost per animal	£1.97	AHVLA SAM data 2013
Extra infections avoided per year - per animal found and culled(R0)	0.71	Based on Conlan et al. (2012) SOR Model http://www.ncbi.nlm.nih.gov/pubmed/23093923
Proportion of animals infected (lower & upper)	0.00131 – 0.00324	VRA proportion from all PrMTs used in IA (2012) Defra Statisticians analysis (2014)
Proportion of infected animals identified by pre-movement test	70%	Defra/AHVLA veterinary advice
Batch factor (to account for fact that two animals may end up at one farm resulting in over counting of number of new incidents of TB)	0.9254	Pre-movement testing review (2010) http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/pre-movement-testing-review.pdf
Probability of controlled hotspot	2%	Pre-movement testing regulatory impact assessment (2005) http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/prmt-regulatory.pdf
Number of herds affected by controlled hotspot	4	Pre-movement testing regulatory impact assessment (2005) http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/prmt-regulatory.pdf
Probability of uncontrolled hotspot	0.01%	Pre-movement testing regulatory impact assessment (2005) http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/prmt-regulatory.pdf
Number of herds affected by uncontrolled hotspot	100	Pre-movement testing regulatory impact assessment (2005) http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/documents/prmt-regulatory.pdf

11. Wider impacts

Economic Impacts

Small firms impact test

In 2012/13 the average number of employees across all sizes of lowland grazing livestock was 2.1, and just 4.9 for the largest farms.²³ An exemption for small and micro businesses would therefore likely apply to all holdings with SOAs and completely undermine the policy.

12. One In, Two Out (OITO)

This measure to remove pre-movement testing exemptions for cattle moved within SOAs that are solely in the annually tested area of England is in scope of OITO. It is a regulatory measure for which the monetised benefits to business are less than the monetised costs and therefore takes IN status. We estimate that the policy generates an annual net cost to business of £0.12m (in 2009 prices, discounted to 2010). See annex table A.9 - A.11 for figures.

²³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267479/fbs-farmaccountsengland-19dec13.pdf

Annex

Table A.1 – Within-herd & between-herd yearly benefits low/high estimate summary

Total benefit range	Estimate	Farmer	Taxpayer	Total
Within-herd	Low	£7k	£7k	£14k
	High	£25k	£23k	£48k
Between-herd	Low	£1k	£1k	£2k
	High	£26k	£38k	£64k
Total benefits	Low	£8k	£8k	£16k
	High	£51k	£61k	£112k

Table A.2 – Net benefit to business (low estimate) PrMT SOAs > 10 miles

Net benefit to business - low	Yearly	10 year present value
Cost	£240k	£2.1m
Benefit	£8k	£0.07m
Net benefit	-£232k	-£2.0m

Table A.3 – Net benefit to business (high estimate) PrMT SOAs > 10 miles

Net benefit to business - high	Yearly	10 year present value
Cost	£124k	£1.1m
Benefit	£51k	£0.4m
Net benefit	-£72k	-£0.6m

Table A.4 – Total net benefits (low) of SOAs PrMT >10 miles

Total benefits - low	Yearly	10 year present value
Cost	£240k	£2.1m
Benefit	£16k	£135k
Net benefit	-£225k	-£1.9m

Table A.5 – Total net benefits (high) of SOAs PrMT >10 miles

Total benefits - high	Yearly	10 year present value
Cost	£124k	£1.1m
Benefit	£112k	£967k
Net benefit	-£11k	-£98k

Table A.6 – Total net benefits (central) of SOAs PrMT >10 miles

Total benefits - central	Yearly	10 year present value
Cost	£182k	£1.6m
Benefit	£64k	£551k
Net benefit	-£118k	-£1.0m

Table A.7 – Cost estimate summaries

Range of costs	Average number of movements per business	Number of animals pre-movement tested	Cost per move	Cost to business
Low	31	20225	£9	£123,789
Central	Centralised median			
High	44	14344	£12	£240,427

Table A.8 – Benefit estimate summaries

Range of benefits	Within-herd benefits: animals avoided becoming infected	Between-herd benefits: number of animals avoided becoming hotspots	Benefit to business
Low	7.8	0.84	£7,941
Central	Centralised median		
High	27.3	46	£51,457

Table A.9 – EANCB calculation low benefit/high cost scenario

Low benefit/high cost	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	PV	EA
Total gross cost	£240,427	£240,427	£240,427	£240,427	£240,427	£240,427	£240,427	£240,427	£240,427	£240,427	£2,069,520	£194,188
Total benefit	£7,941	£7,941	£7,941	£7,941	£7,941	£7,941	£7,941	£7,941	£7,941	£7,941	£68,355	£6,414
Total net benefit (NPV)	-£232,486	-£232,486	-£232,486	-£232,486	-£232,486	-£232,486	-£232,486	-£232,486	-£232,486	-£232,486	-£2,001,164	£187,774

Table A.10 – EANCB calculation central scenario

Central	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	PV	EA
Total gross cost	£182,108	£182,108	£182,108	£182,108	£182,108	£182,108	£182,108	£182,108	£182,108	£182,108	£1,567,529	£147,085
Total benefit	£29,699	£29,699	£29,699	£29,699	£29,699	£29,699	£29,699	£29,699	£29,699	£29,699	£255,641	£23,987
Total net benefit (NPV)	-£152,409	-£152,409	-£152,409	-£152,409	-£152,409	-£152,409	-£152,409	-£152,409	-£152,409	-£152,409	-£1,311,888	£123,097

Table A.11 – EANCB calculation high benefit/low cost scenario

High benefit/low cost	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	PV	EA
Total gross cost	£123,789	£123,789	£123,789	£123,789	£123,789	£123,789	£123,789	£123,789	£123,789	£123,789	£1,065,538	£99,982
Total benefit	£51,457	£51,457	£51,457	£51,457	£51,457	£51,457	£51,457	£51,457	£51,457	£51,457	£442,927	£41,561
Total net benefit (NPV)	-£72,332	-£72,332	-£72,332	-£72,332	-£72,332	-£72,332	-£72,332	-£72,332	-£72,332	-£72,332	-£622,612	£58,421

