

# Global access to and availability *of insulin*

☒ **Graham Ogle, David Beran, Ron Raab, Larry Deeb on behalf of the Task Force on Insulin, Test Strips and Other Diabetes Supplies**

*The first practical use of insulin by Banting and Best in 1921 heralded a medical revolution. Overnight, type 1 diabetes went from being a uniformly fatal disease to a manageable disorder. Thousands of people around the world have received awards for surviving 50 years on insulin – some reaching 80 years. Insulin is classified by WHO as an essential drug. Yet, 85 years after its discovery, untold thousands of people with type 1 diabetes and type 2 diabetes in developing countries die each year because they can neither readily access nor afford insulin. Many more people with type 2 diabetes would greatly benefit from insulin, if only they had access.*



In the developed world and some developing countries, insulin is provided free or at minimal cost by government health services or insurance arrangements. Where this is not so, and the drug is not provided by charitable

organizations, insulin must be purchased at market or premium prices. A 10 ml vial of 100 unit per ml insulin costs up to 30 USD. Assuming an average price of 15 USD, a person with type 1 diabetes using 50 units per day will use

18 vials per year – a cost of 270 USD per year. This may exceed the family's total annual income. The financial impact is compounded by other components of care – syringes and needles, blood glucose monitoring, consultation fees, travel expenses – and missed work days.

The price of insulin is influenced by many factors, including the original price from the manufacturer, transport and storage costs, size of market, the profit margins of distributors and retailers, and government taxes. It is frequently those most in need who are most adversely affected by these factors – smaller countries with small markets and transport problems, multiple intermediaries, excessive bureaucracy, tariffs and sometimes corruption.

When there are only a few people receiving insulin in a particular province, the drug may not be regularly available. In many health centres around the world, it is not available at all.

**Worldwide usage**

It is difficult to access data on insulin access and usage worldwide. Three sources have provided information in the last 10 years.

**Inequitable distribution**

Data published by IDF recorded that an estimated 150 million vials of insulin were produced yearly with the vast majority being used in developed countries. 70% of all insulin was used in countries that comprised 16% of the world's population.<sup>1</sup>

**Little improvement**

In 1997 and 2002, IDF's Task Force on Insulin, Test Strips and Other Diabetes Supplies conducted two surveys of IDF Member Associations. Little improvement was noted over the 5-year period. The 2002 survey showed that 30 of 74 countries did not have continual and uninterrupted access

to insulin for people with diabetes 100% of the time. The main reasons were cost, regional lack of availability, transport problems, lack of adequate supply and poor quality of insulin.

Of the 74 countries, 31 had taxes on insulin, ranging from 1% to 90%. Animal insulin was generally cheaper than human insulin; and insulin in vials was cheaper than the same type of insulin in cartridge form. IDF's latest survey on access to insulin will be published in the 3<sup>rd</sup> edition of IDF's *Diabetes Atlas*, to be launched in December 2006.

**Useful data**

We have been provided with one-off access to global insulin usage data by a major health market research company (IMS). The IMS data is collected as follows: the company conducts a market audit – collecting

information from a limited number of private pharmacies and other sources, such as hospitals, where possible. The market is followed for a certain period (1 month or 3 months, for example) and extrapolations are made.

Data relating to 2005 were available for 65 countries and two regions (French-speaking West Africa and Central America) covering around 80% of the world's population. There are numerous limitations to this data which are readily acknowledged by IMS. The data do not include government purchases or tenders. For this reason, some countries – most of the African countries, several Asian countries and smaller countries such as the Pacific Island and Caribbean nations – are not audited at all. The data also do not include donations; data are likely more accurate for developed countries than for developing countries.

**Table 1: Insulin use according to IMS data**

IDF Regions	Population of countries with data (in millions) <sup>1</sup>	Total insulin (IU) sold in countries surveyed (in millions) <sup>2</sup>	Total number of people of all ages who should receive insulin (in millions) – Scenario 1 <sup>3,4</sup>	Total number of people of all ages who should receive insulin (in millions) – Scenario 2 <sup>3,4</sup>	Adequacy of insulin supply – Scenario 1 <sup>4,5</sup>	Adequacy of insulin supply – Scenario 2 <sup>4,5</sup>
AFR	130	2,275	0,2	0,4	83% <sup>6</sup>	43% <sup>6</sup>
EMME	337	8,246	1,4	2,8	40%	21%
EUR	711	123,601	4,5	8,8	193%	98%
NA	414	93,330	2,3	4,6	276%	141%
SACA	393	4,848	1,4	2,6	25%	13%
SEA	1,207	9,088	4,0	7,9	16%	8%
WP	1,880	26,882	4,1	8,2	46%	23%

1. Population calculated according to figures in the *Diabetes Atlas Second edition (2003)*, with the missing 15- to 19-year-old age range estimated as 1/3 of the 0 to 14-year population.

People over 80 years were not included.

2. Insulin sales data are not complete; some countries, especially in Africa, are not represented; data does not include all providers in some countries.

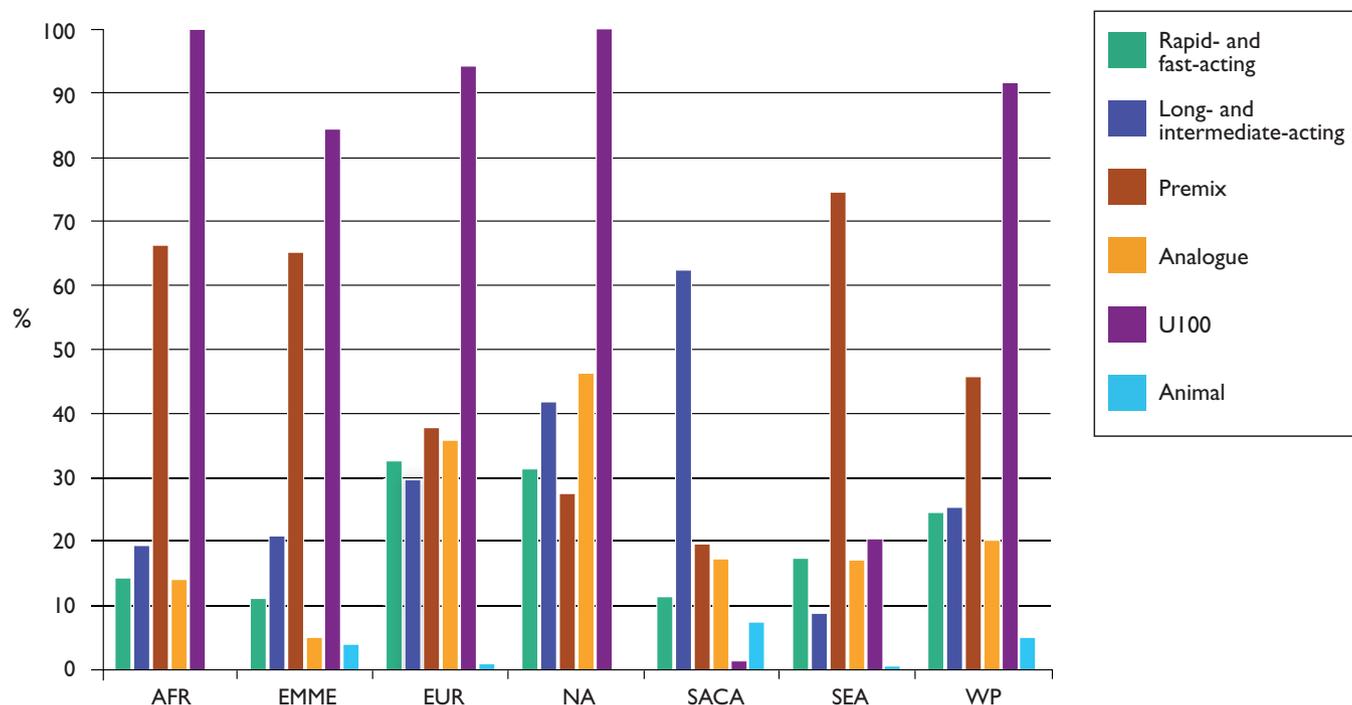
3. Numbers of people with diabetes as per the *Diabetes Atlas Second edition (2003)*, except that the missing 15- to 19-year-old age range was estimated as 2/3 of the 0 to 14 year-old population (as prevalence increases with age).

4. Total number of people requiring insulin calculated as Scenario 1: (all 0 to 19-year-olds with diabetes) + (10% of 20- to 79-year-olds with diabetes); and Scenario 2: (all 0 to 19-year-olds with diabetes) + (20% of 20- to 79-year-olds with diabetes).

5. Adequacy of insulin supply defined as insulin sold/(number of people with insulin) x (average use of 1200 IU per month).

6. This data cannot be generalized for the whole of Africa and should be interpreted with caution since data was only available for French-speaking West Africa and South Africa. Insulin may be available but not necessarily affordable.

Figure 1: Usage of insulin type by IDF Regions according to IMS data<sup>1</sup>



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### Useful conclusions

Given the limitations of these data, conclusions must be drawn carefully. However, of all the information on worldwide insulin usage to which IDF has had access in recent years, this is the most comprehensive; some useful observations can be made regarding the types of insulin used (for usage by region, see Table 1 and Figure 1).

- Use of animal insulin was low overall, but was still common in some countries – Ukraine 18%, China 21%, Pakistan 12%, Argentina 8%, Brazil 14%, and Uruguay 37%.
- Most countries used U100 insulin exclusively. However, non-U100 insulin (nearly all U40; U80 was used in two countries) was commonly used in Egypt

57%, Hungary 11%, Ukraine 66%, Bangladesh 35%, India 83%, China 37%, and Indonesia 24%.

- Analogue insulin was commonly used in most countries in Western Europe, the USA and Canada, Jordan, Kuwait and Lebanon, and some South American and Western Pacific countries. Use was generally much lower (or absent) in poorer countries – presumably due to price issues. Analogue insulins have not yet been approved for use in all countries.
- Premix insulin was most commonly used in the African, Eastern Mediterranean and Middle Eastern, and South-East Asian regions, and some countries in the Western Pacific region.

Data were also available on insulin usage in each country. However, because the data on many countries are incomplete, it would not be appropriate to draw detailed conclusions from this information. It should also be noted that in most countries, especially in sub-Saharan Africa where people with diabetes have to pay for insulin, insulin can be available but not easily affordable. Nonetheless, it is clear that despite the existence of a diabetes population of similar size in the developing world, the great majority of the world's insulin is used in developed countries. Furthermore, IDF predicts a 55% increase in the number of people with diabetes worldwide by 2025, with the largest increases being in developing nations.

### What can be done?

Governments in developing countries struggle to deal with many pressing health and social issues. Diabetes care is expensive, and funding must compete with programmes such as those striving to control infectious diseases – which can often save more lives on a cheaper per-capita basis. Yet some countries manage to provide insulin free or at nominal cost (some Pacific Island nations, for example), or at subsidized prices (some African countries). In others, at least insulin is available free for children with diabetes.

#### Step-wise approach

By providing insulin at lower costs these governments not only contribute to the well-being of a portion of their population, they prevent expensive disabling and life-threatening complications – conditions which increase healthcare costs for the patient and health system. If the provision of free insulin is currently not feasible, governments should be encouraged to proceed one step at a time – eg abolishing all taxes and duties, subsidizing prices, providing free insulin for all children.

#### Industry response

In this respect, the LEAD initiative by Novo Nordisk is helpful. The governments of the world's 50 least developed countries (as recognized by the UN) can purchase insulin at no more than 20% of the average price in the industrialized countries of Europe, North America and Japan. Some manufacturers, such as Eli Lilly, have programmes to supply some insulin at subsidized cost, or by donation, according to their own criteria. The

company also produces 4 ml vials for countries where people cannot afford to pay the price of a 10 ml vial.

The appearance of new insulin manufacturers is another positive step. Competition and greater supply ought to lead to lower prices. It is important though that all manufacturers comply with the necessary stringent efficacy, safety, and quality-control guidelines. WHO should also be encouraged to extend their medication prequalification process to include insulin manufacturers, as the benefits of access to reliable and cheap sources of insulin may mean the difference between life and death for many people (for more information visit <http://mednet3.who.int/prequal/>).

#### Prevent further inequity

The data presented above show that animal insulin is still used in a number of countries (some of which have large populations). The main reason for this is that it is cheaper than human insulin. Our Task Force and numerous other groups have fought a rearguard action for some years to preserve access to animal insulin. This has been very difficult due to the financial imperatives that drive the pharmaceutical business. The battle may soon be renewed as brand-specific pen-fill cartridges start to replace 10 ml vials, and analogue insulins replace human insulin.

Pen devices using cartridges and analogue insulins provide improvements in quality of life for those who can afford them. However, it is imperative that they do not completely displace access to cheaper forms of insulin. We must try at all cost to avoid a situation where rich people with diabetes receive

better treatments while poor people die because they can no longer afford these improved but more expensive insulins.

### Improved access for millions

Currently, there are many examples of innovative programmes that result in cheaper sources of insulin – and indeed strips and other supplies – for people living in countries where insulin is not subsidized. Several of the articles in this special issue give information about effective programmes in a number of countries. With encouragement and support, these and other similar initiatives have the potential to improve access to insulin for the millions of people struggling in daily life to obtain adequate amounts of this life-saving medication.

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#### Acknowledgements

IMS data was made available to the Task Force thanks to the generous support of Eli Lilly. The authors would also like to thank Sylvia Lion for compiling the IMS data.

#### Reference

- 1 Jervell J. Variations in utilization and cost of insulin. *IDF Bulletin* 1996; 41 Special Issue: 1.