The shifting epidemiology of hepatitis A following routine childhood immunization program in Israel

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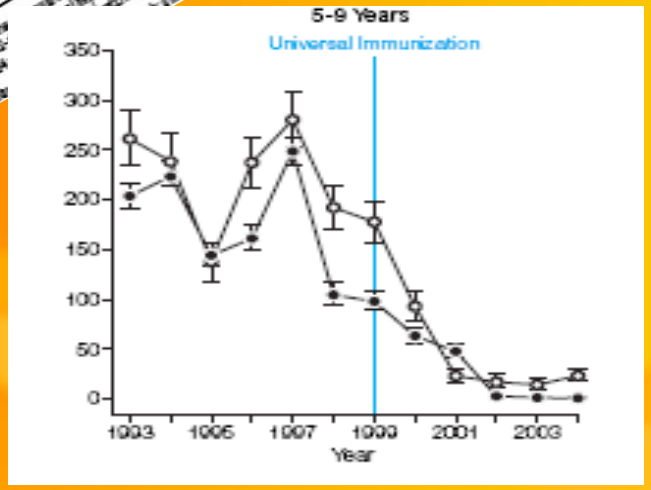
Background

- For many years Israel has been an endemic country for hepatitis A (HA).

- In 1999, it became the 1st country to introduce the inactivated HA vaccine to its childhood immunization program, with a 2-dose regimen at age 18 & 24m (720 EU/dose).

Background (2)

- A previous study (Dagan et al. 2005) on the impact of the new vaccination program in Israel, described a 95% reduction in morbidity



Background (3)

- Dagan's study was based on passive surveillance that reflects <25% of all HA cases in Israel.

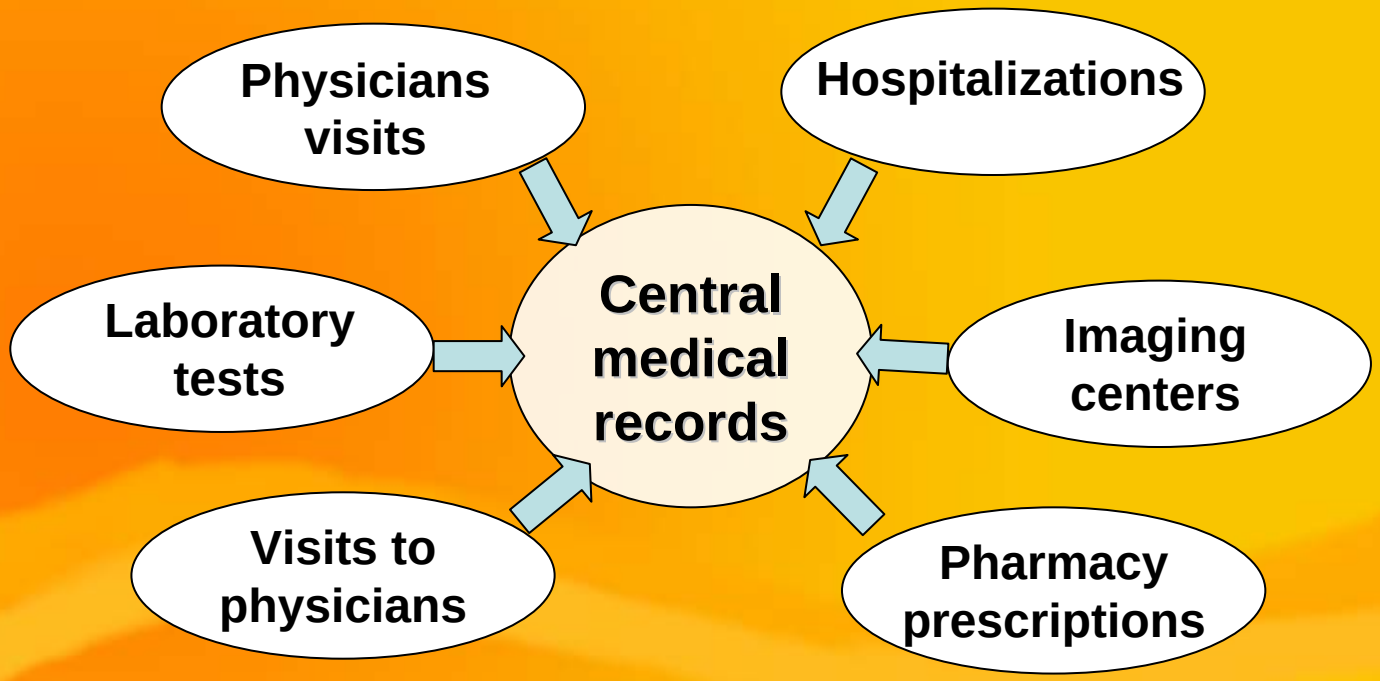
- It provided no data on increased voluntary HA vaccination in older children and adults.

Study objectives

- To assess the uptake of the HA vaccine among all ages.
- To examine trends in the incidence of HA following the new vaccination policy, using data from a large HMO, which are more valid than passive surveillance for studying HA.

Methods (1)

- We used the data of Maccabi Healthcare Services (MHS), Israel's 2nd largest HMO (1.7 million members).



Methods (2)

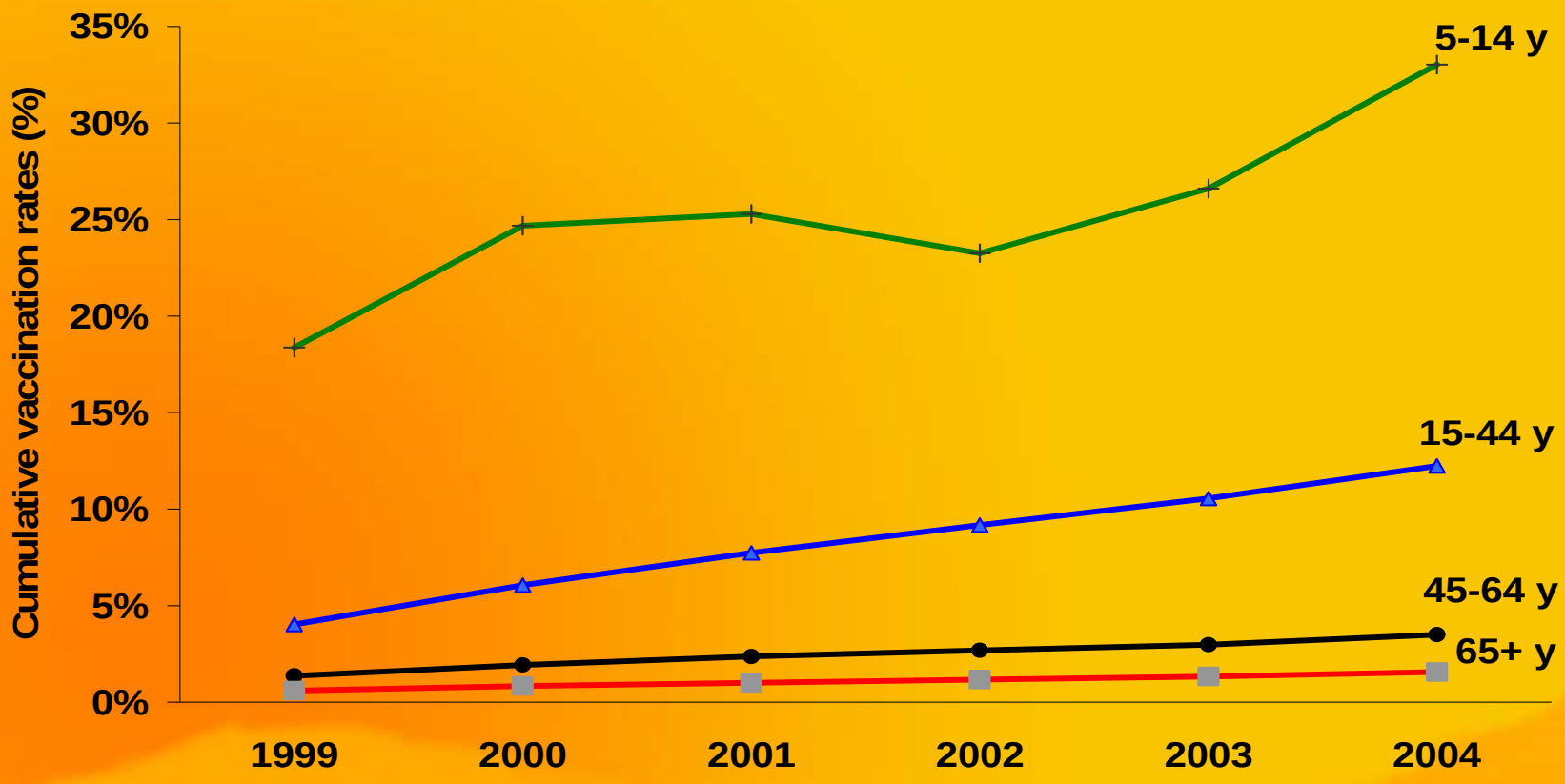
- *HA immunization uptake:* we identified all members who received HA vaccine between 1998-2004. For <2y old members, we applied an uptake rate of 89%.

- *Hepatitis A incidence:* we identified all cases occurring between 1998 -2004 who:
  - **were diagnosed by a GP** as suffering from HA
  - had a positive laboratory detection of **HAV-IgM**
  - were **hospitalized due to HA**.

Validation of HA cases

– We examined the personal computerized files of 40 patients diagnosed with HA. In 86% patient's complaints and symptoms agreed with the disease (e.g. nausea and vomiting, diarrhea, jaundice, and dark urine) or were supported by a positive test result or clinical symptoms.

Hepatitis A immunization uptake

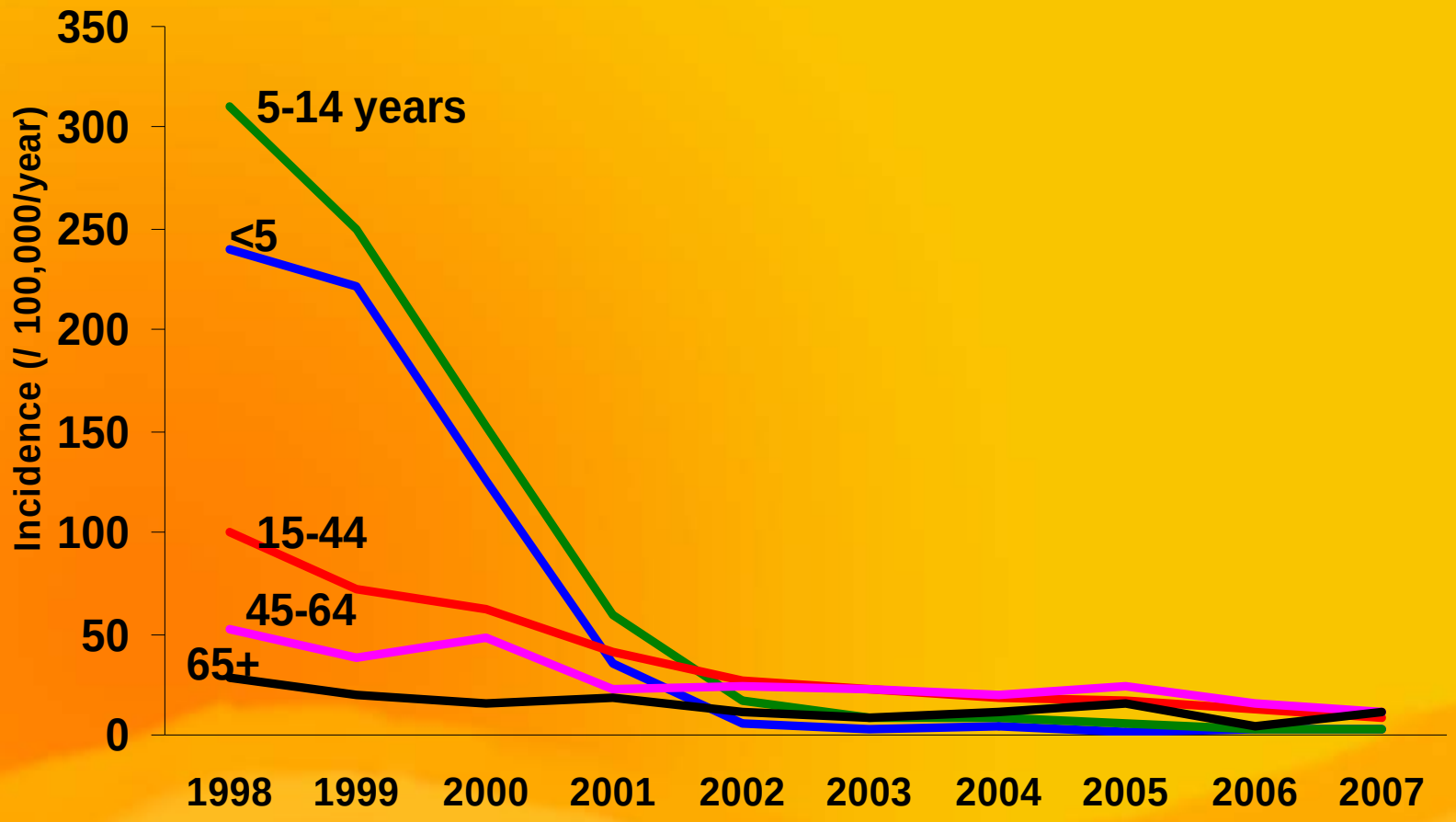


Incidence of hepatitis A

MHS, 1998-2007

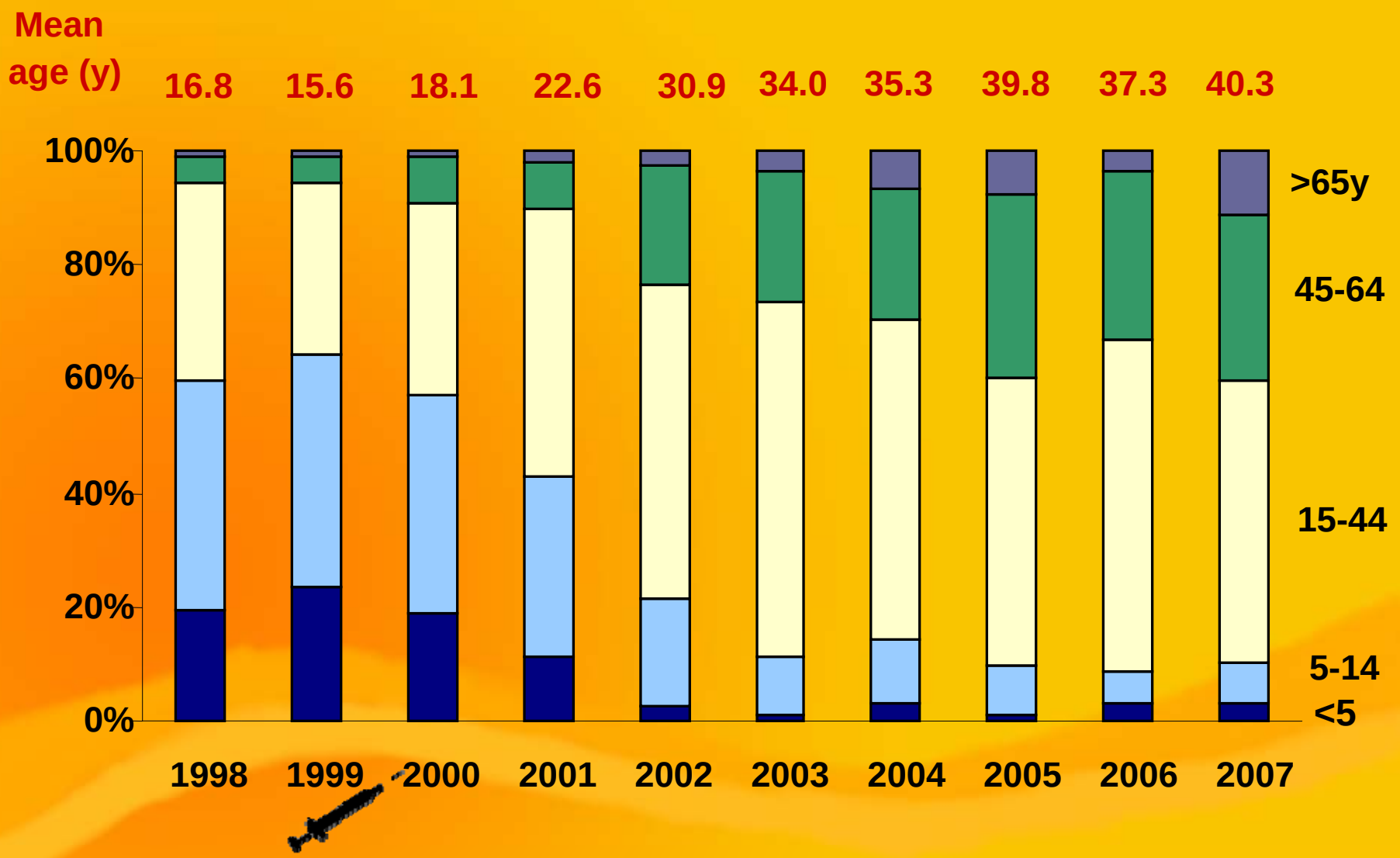
Year	<15y	15-44y	>44y	Total
1998	**1092**	**663**	**129**	**1884**
1999	967	479	99	1545
2000	614	427	123	1164
2001	225	290	76	591
2002	60	192	77	329
2003	29	164	72	265
2004	33	137	72	242
2005	23	123	96	242
2006	15	101	57	173
2007 (Nov.)	**14**	**67**	**55**	**136**

Age-specific incidence rate of HA, MHS 1998-2007

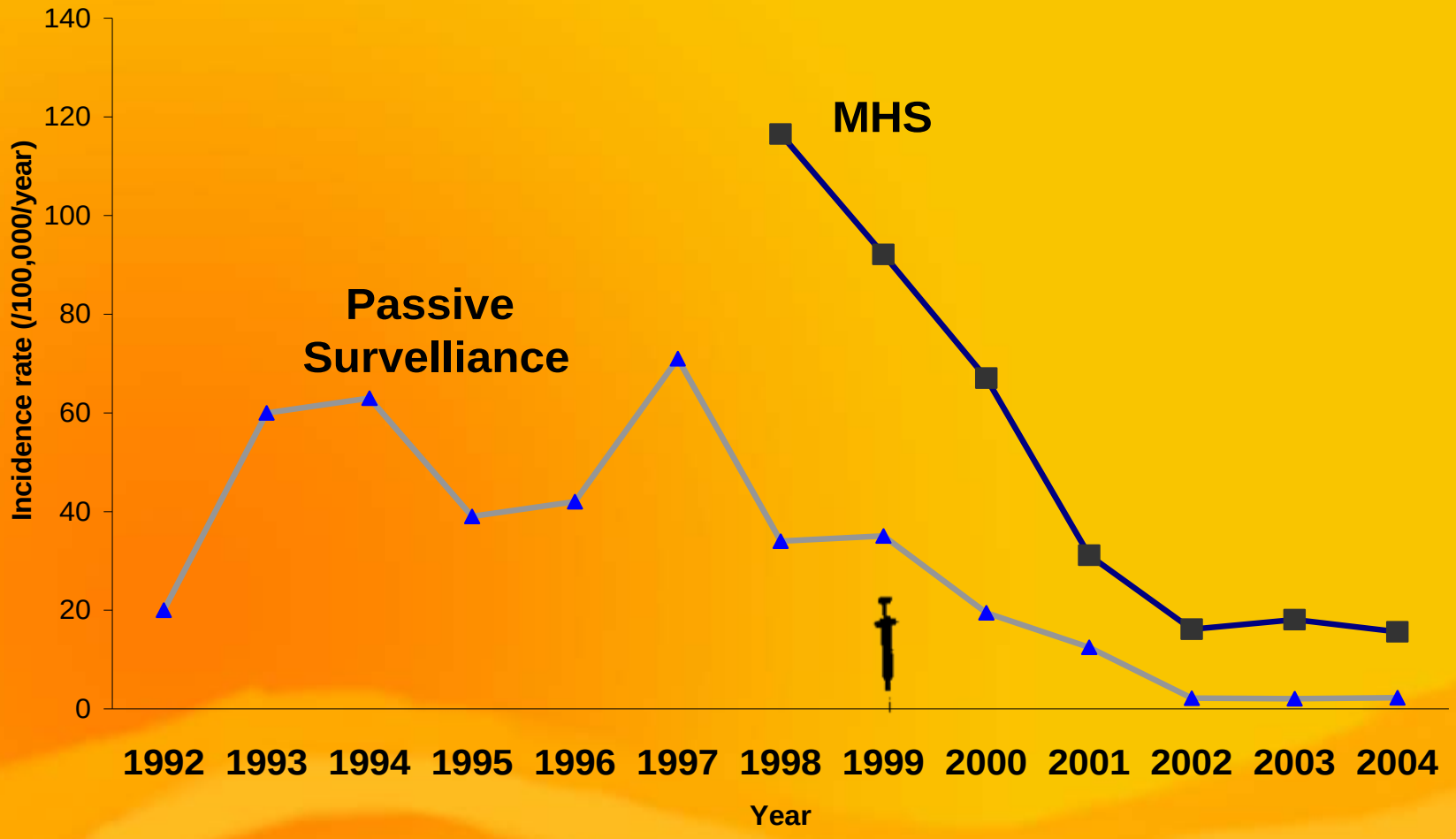


Age distribution of HA patients,

MHS 1998-2007



Incidence of HA in MHS and Israel



Assumptions for calculating Prevented HA cases &complications

	<15y	15-44y	>44y
Hosp. rate (% of cases)	8.5%	20%	42%
Fulminant HA, (% of acute)	0.4%	1%	1%
Fatality rate (% of cases)	0.1%	0.3%	2%

Source: CDC (1987); Shah et al (2000); Ramonet et al. (1985); Lee et al. (2005)

Prevented hepatitis A cases

- According to the study model, avoided HA cases in the period 1999-2007 in MHS (n=10153) would have resulted in:

- **2099 hospitalizations**,
- **37 non-fatal fulminant HA** (22 liver trans.)
- **50 deaths** (29 liver transplants)

Discussion

- There was more than a ten-fold reduction in the total number of cases in 2007 compared with the year prior to immunization (1998).

- This reduced morbidity was particularly marked, but not restricted to, among children, which is consistent with their high vaccine uptake.

Study limitations

- We could not document asymptomatic cases or symptomatic patients that did not refer for medical assistance.

- Our epidemiological model was based upon only a single year prior to the introduction of the HA vaccine (1998).

Conclusions

- The study provides compelling evidence to support the decision to introduce the HA vaccine to the national childhood immunization schedule in Israel.

- The decision was accompanied by a positive cost-benefit analysis that **assumed** an annual **reduction of 11.5%** in morbidity; however, the **actual reduction** was **25.3%.**

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