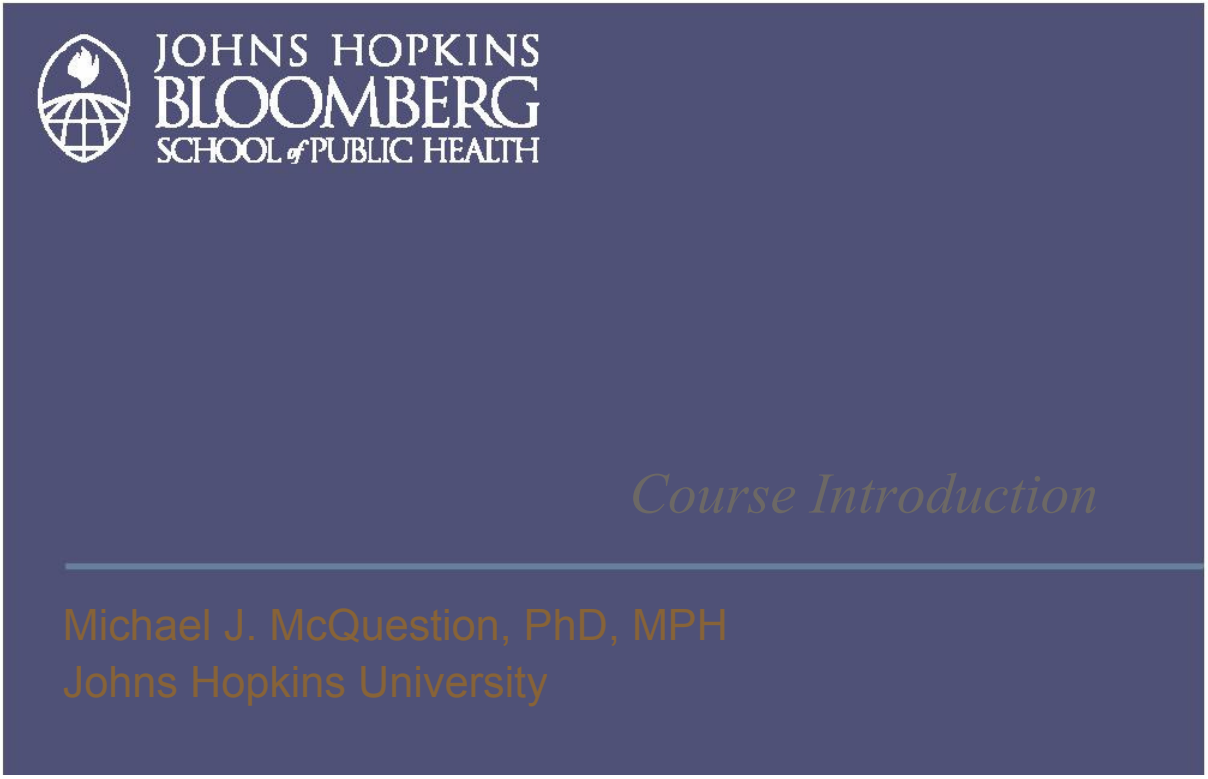


Introduction

Peace Corps volunteer, rural public health, The Philippines

Technical officer in WHO/PAHO

Global supervisor, PolioPlus Program, The Rotary Foundation

Current research on demographic impacts of primary health care programs

2

Whom to Contact

Prof. McQuestion: psip@jhsph.edu

- For all substantive queries

Deborah Vazirani: psip@jhsph.edu

- For all curriculum-related matters (including assignments)

DEhelp

- For all technical issues

3

Theory of the Course

Highlight, theorize, and analyze problems that program managers typically face

Identify similarities and dissimilarities between developed and developing countries

Integrate case studies with current journal articles

Reward theoretical synthesis while emphasizing a problem-solving approach

4

Whats Expected

Complete all required readings before viewing lectures

Focus on theoretical, practical aspects of the readings rather than methodological details

View every lecture

Participate actively in LiveTalks and BBS

Turn in all assignments on time

5

Readings

Readings are mostly current refereed journal articles; some are technical reports

You must read all required readings

You can also draw from recommended readings

There is no course pack

- All readings are available in PDF format

6

Quizzes

There are six quizzes for Modules 15

Do them after completing all required readings and viewing the corresponding lectures

They are worth 30% of your grade

7

Small Group Exercises

The class will be divided into small groups

Each group will complete Exercises 2, 3, and 4

- Exercise 1 is an individual exercise

The exercises are worth 30% of your grade

After all four exercises have been submitted, members from each group are required to complete and submit peer evaluations

Peer evaluations will be factored into the grading

8

Web Links

Some lectures feature links to related Web sites

You are encouraged (but not required) to visit them and draw from them in the exercises

9

Bulletin Board

The BBS is a tool for enhancing learning

Use it to share questions and insights with other class members

We will monitor it and contribute as appropriate

10

LiveTalks

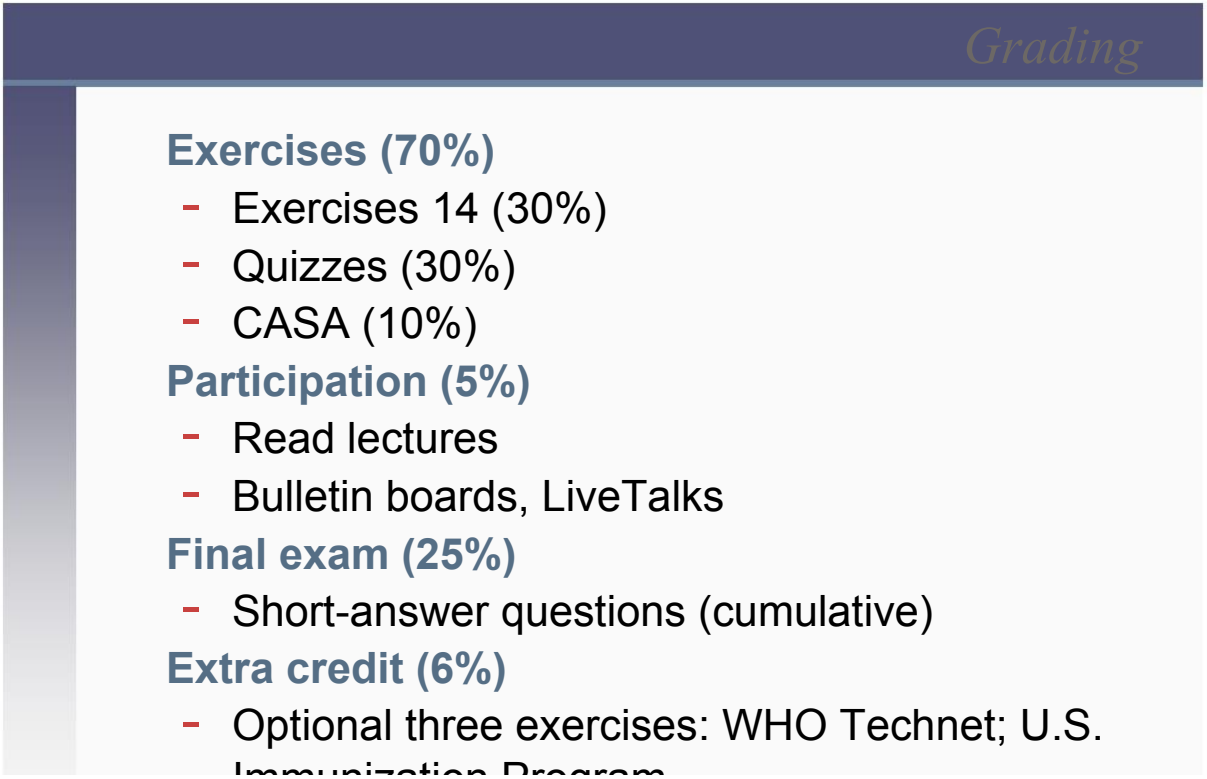
LiveTalks will be used to integrate the material covered in each module

Be prepared to discuss any topic covered

All are expected to participate

Archived LiveTalks are available

11


Grading
Exercises (70%)
- Exercises 14 (30%)
- Quizzes (30%)
- CASA (10%)
Participation (5%)
- Read lectures
- Bulletin boards, LiveTalks
Final exam (25%)
- Short-answer questions (cumulative)
Extra credit (6%)
- Optional three exercises: WHO Technet; U.S.

Immunization Program
CASA/AFIX; and GAVI

12

Tools: CASA

CASA is a free software program developed by CDC which you will download and use in an exercise analyzing immunization records

Work through the CASA tutorial before attempting the assignment

13

Online Evaluations

Do the online evaluations after each lecture

They are quite short and will help us improve the course

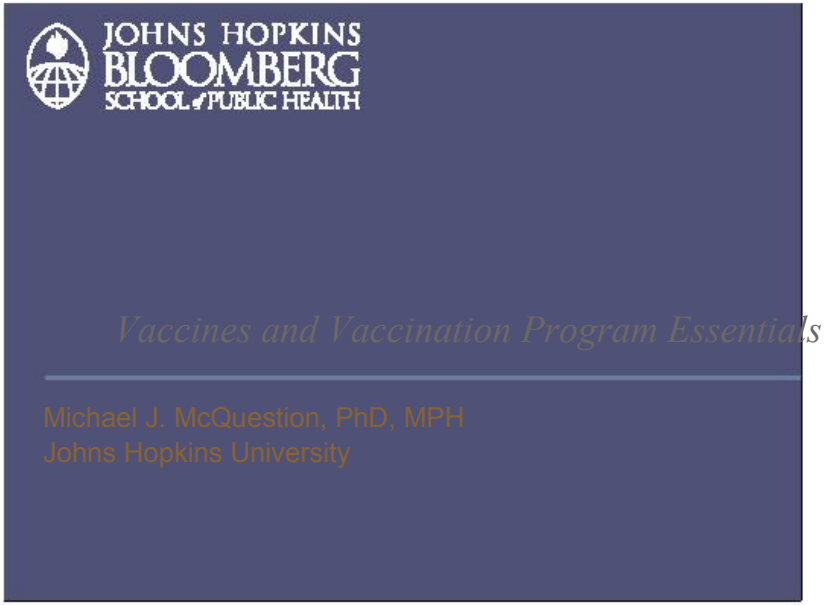
All online evaluations are anonymous and will not affect your grade

14

Lecture Evaluation

Your feedback on this lecture presentation is very important and will be used for future revisions. Please take a moment to evaluate this lecture. The Evaluation link is available on the lecture page.

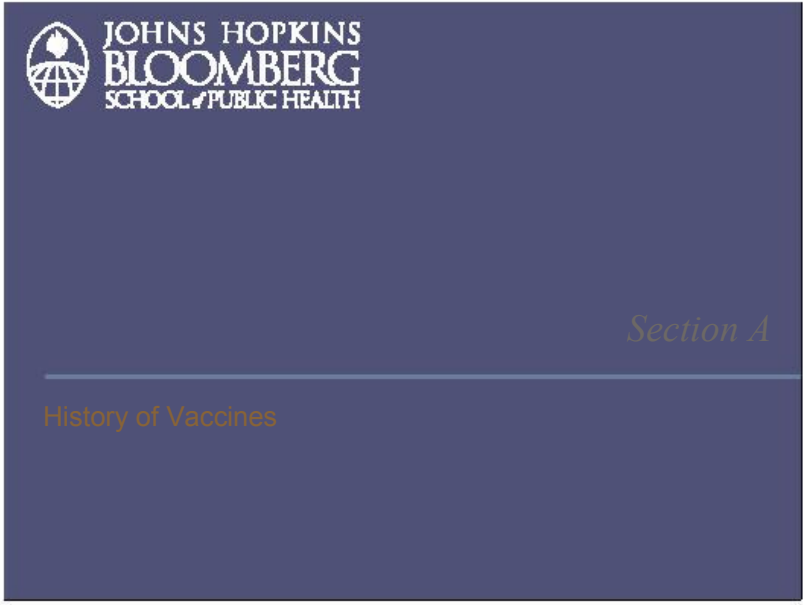
15

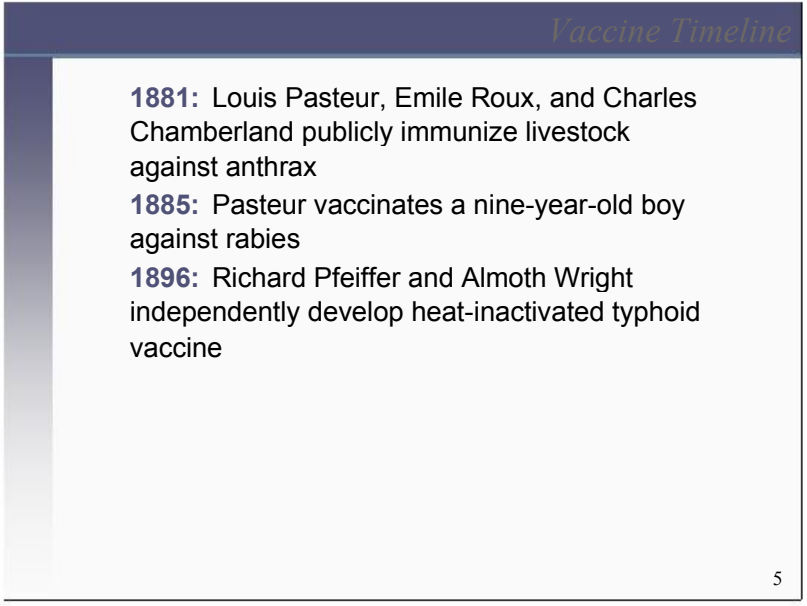


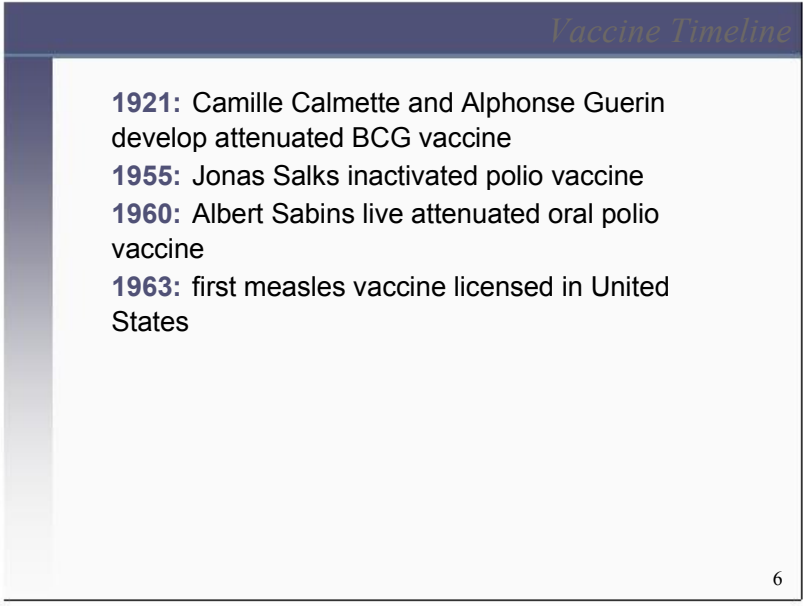
Definition

Vaccine : A preparation of killed microorganisms, living attenuated organisms, or living fully virulent organisms that is administered to produce or artificially increase immunity to a particular disease Merriam-Webster Dictionary, 2005

2







Vaccine Timeline

1971: live attenuated measles/mumps/ rubella (MMR) vaccine licensed in United States

1981: recombinant DNA hepatitis B vaccine

1985: first Haemophilus influenzae B (Hib)

1989: conjugate Hib vaccine licensed

2000: pneumococcal conjugate vaccine (PCV) licensed

7

Morbidity Comparison

Comparison of 20th Century Annual Morbidity and Current Morbidity, Vaccine-Preventable Diseases

Disease	20th Century Annual Morbidity	2003* (Provisional)	Percent Decrease
Diphtheria	175,885	1	99.99%
Measles	503,282	42	99.99%
Mumps	152,209	197	99.87%
Pertussis	147,271	8,483	94.29%
Polio (paralytic)	16,316	0	100%
Rubella	47,745	7	99.99%
Congenital Rubella Syndrome	823	0	100%
Tetanus	1,314	14	98.93%
H. influenzae, type b and unknown (<5 yrs)	20,000	213	98.94%

Source: CDC. MMWR April 2, 1999. 48: 242-264
* Source: CDC. MMWR January 9, 2004. 52:1277-1300
Data are estimated.

Numbers in yellow indicate at or near record lows in 2003

Notes Available

8

This favorite slide of Walts demonstrates continued

This favorite slide of Walts demonstrates continued success of the program in achieving and maintaining record lows in virtually all of the vaccine-preventable diseases listed as indicated in yellow

Estimated Vaccination Coverage with the 4:3:1:3:3* Series, by Coverage Level and State
National Coverage = 73%

Source: National Immunization Survey, 2000
Children in the 2000 NIS were born between February 1997 and May 1999

CDC

9

Estimated Vaccination Coverage with the 4:3:1:3:3 Series, by Coverage Level and State
National Coverage = 75%

SAFER • HEALTHIER • PEOPLE™

10


Printable Vaccine Schedule
http://www.cdc.gov/nip/recs/child-schedule.htm#Printable
11

WHO-Recommended Vaccination Schedule

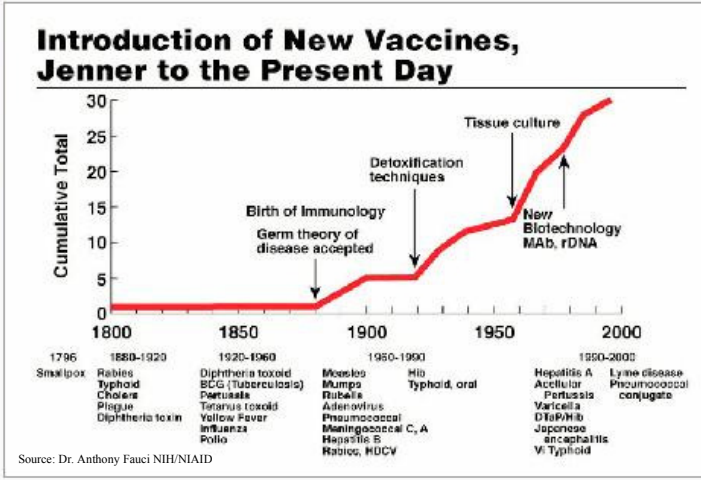
WHO-Recommended Vaccination Schedule			
Age	*Vaccine*	*Scheme A*	*Scheme B*
Birt h	**BCG, OPV**	**HB1**	
6 wee ks	**DPT1, OPV1**		
10 weeks	**DP T2, OPV2**		**HB2**
14 weeks	**DPT3, OPV3 HB3**		**HB3**
9 months	**Measles**		
	Yellow fever (where risk exists)		
	Hepa titis B Vaccine**		

**Accord ing to p erinatal tran smissio n rat es
From UNICEF, 1996

12

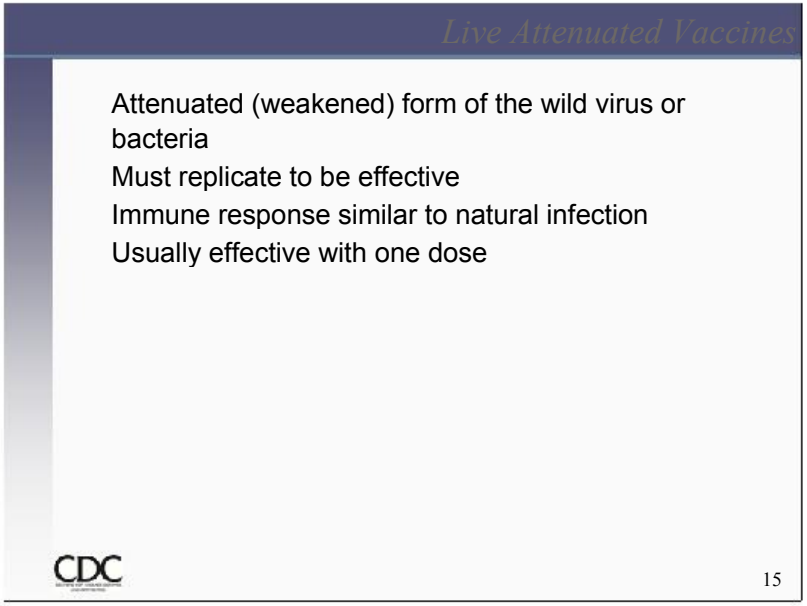
Increased Demands

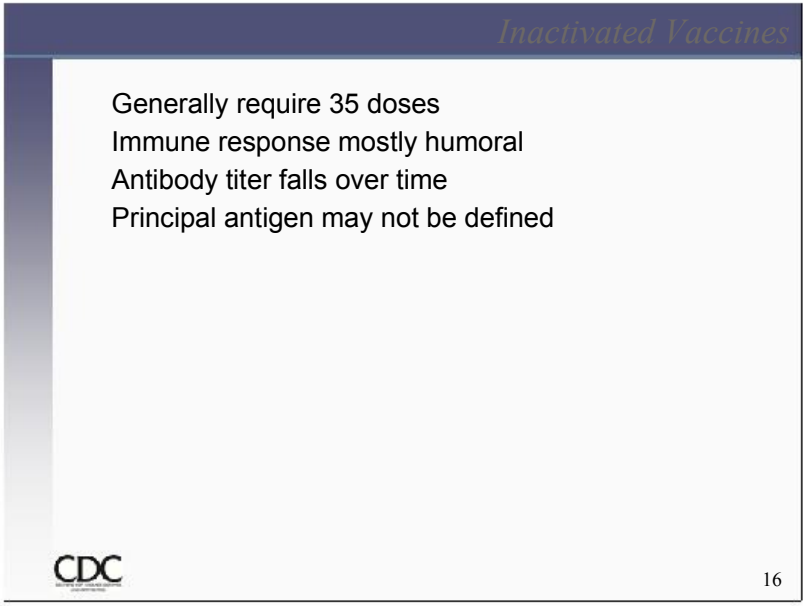
13

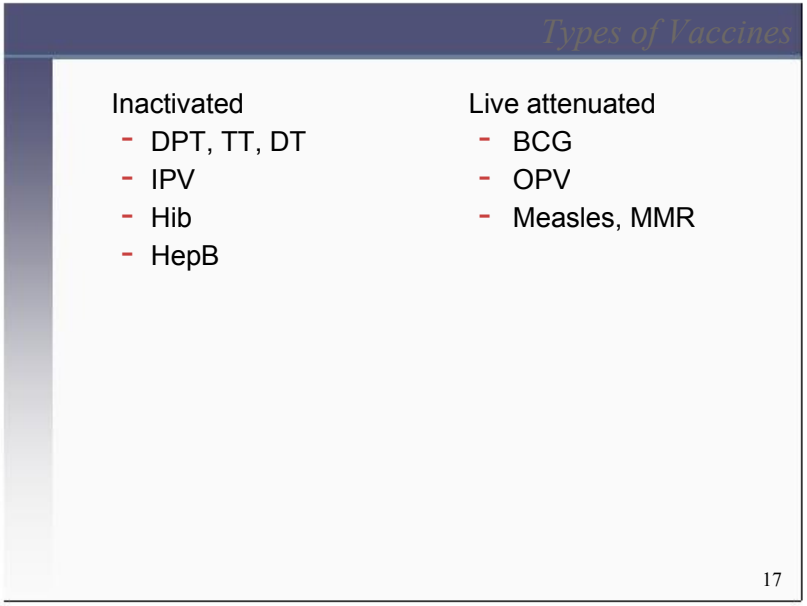


Source: Bruce Gellin, MD, MPH, Executive

Director, National Network for Immunization Information. May 31, 2001, National Immunization Conference





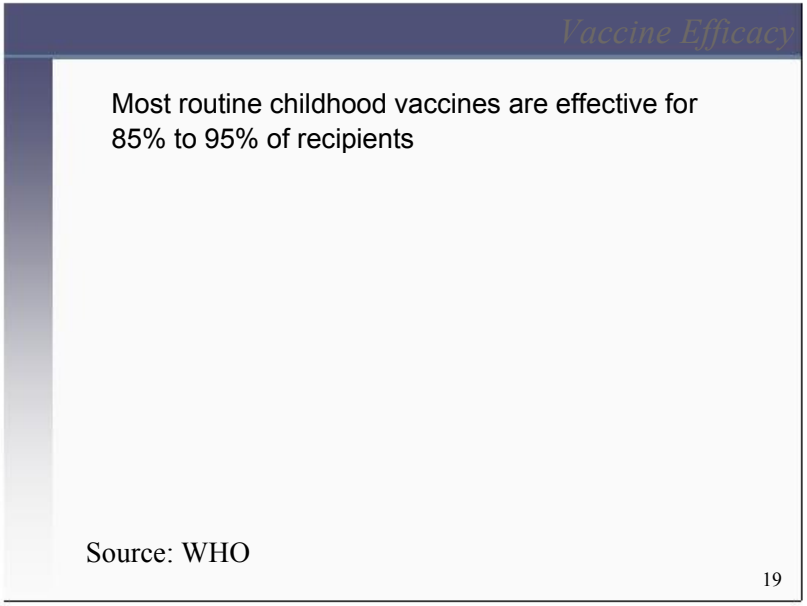


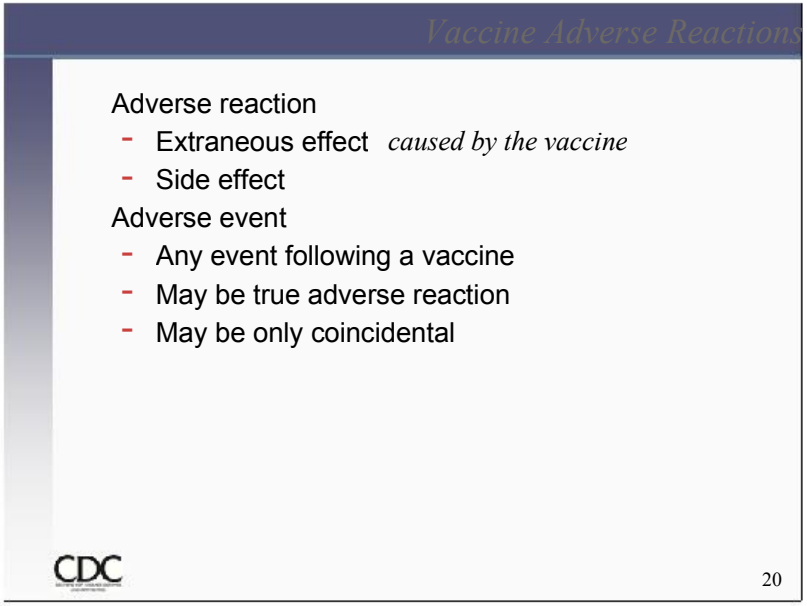
General Rules

- There are no contraindications to simultaneous administration of any vaccinesexcept cholera and yellow fever vaccines
- Increasing the interval between doses of a multi-dose vaccine does not diminish the effectiveness of the vaccine
- Decreasing the interval between doses of a multi-dose vaccine may interfere with antibody response and protection
- It is not necessary to restart the series of any vaccine* due to extended intervals between doses * (except oral typhoid vaccine in some circumstances)

CDC

18





Adverse Events

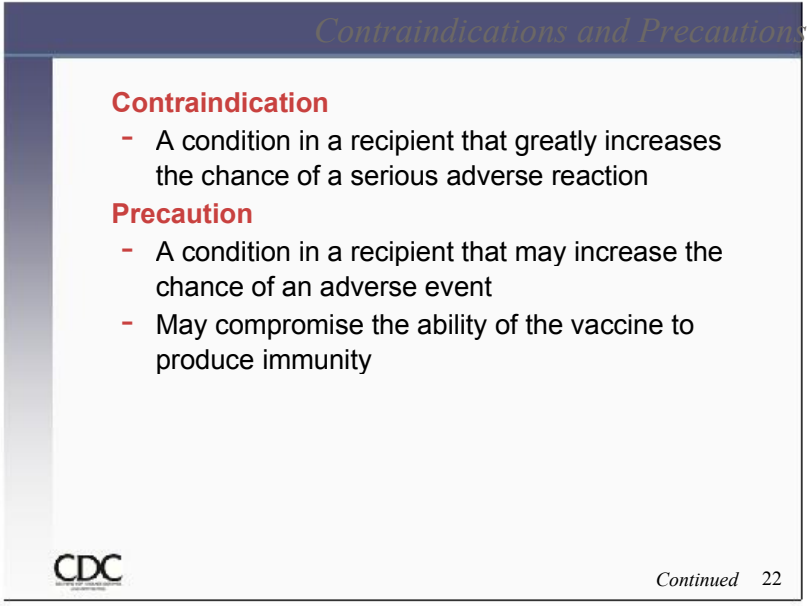
Estimated Serious Adverse Events Rate s Following Some Childhood Vaccines

Vacci ne	*Est im at ed Rat e*
BCG	1 in 1,000 to 1 in 50,000 do ses
OPV (Oral polio vaccine) 1	in 3 million doses for the first do se of OPV
Measle s	1 in 1 million do se s
DTP	1 in 750,000

21

Source:

WHO



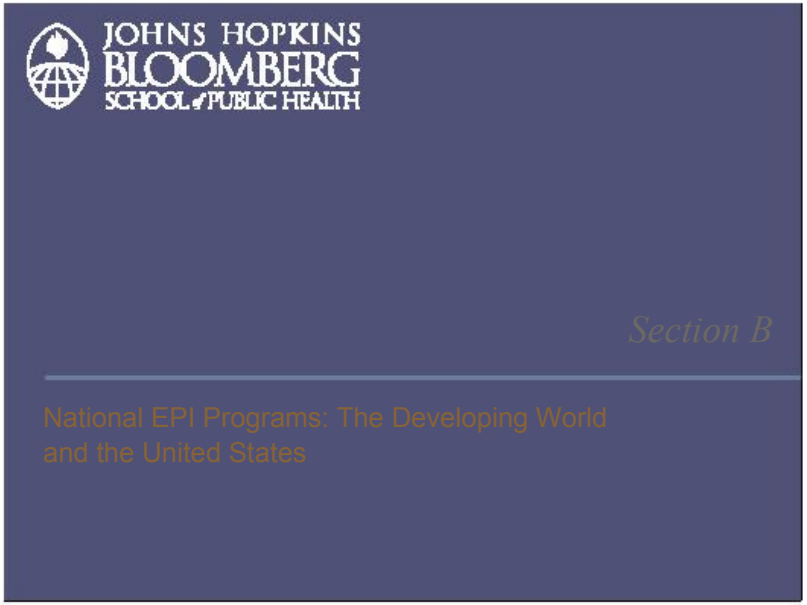
Contraindications and Precautions

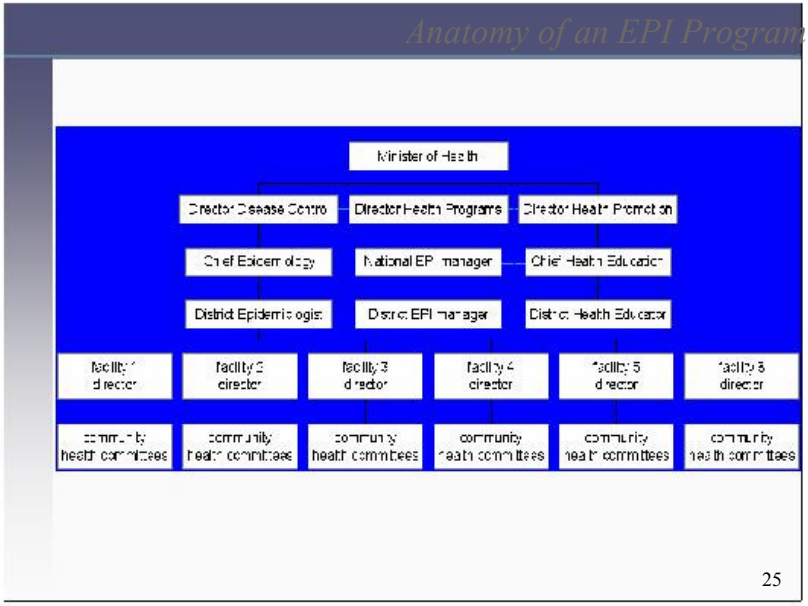
Permanent contraindications to vaccination

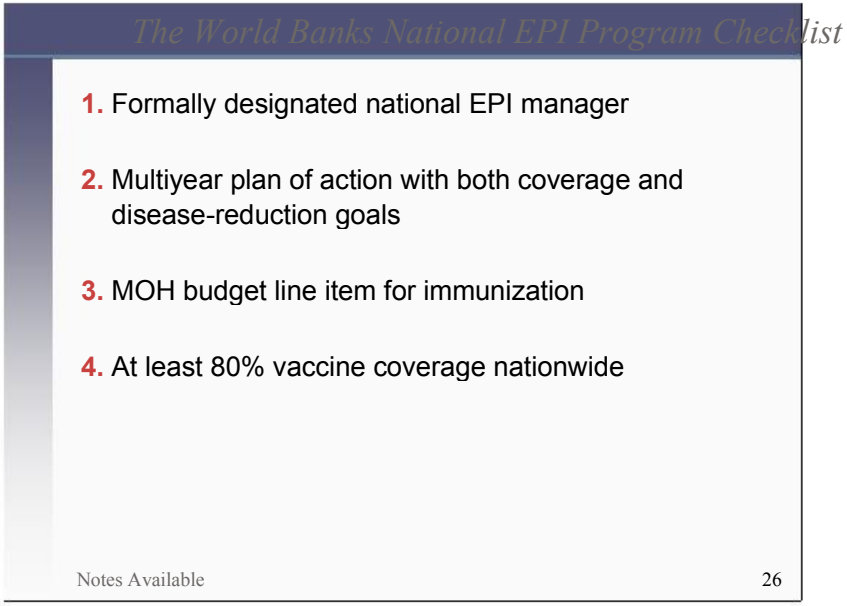
- Severe allergy to a prior dose of vaccine or to a vaccine component
- Encephalopathy following pertussis vaccine

In fact, serious adverse reactions to vaccination are rare, and the misdiagnosis of precautions and contraindications is a leading cause of missed vaccination opportunities

23

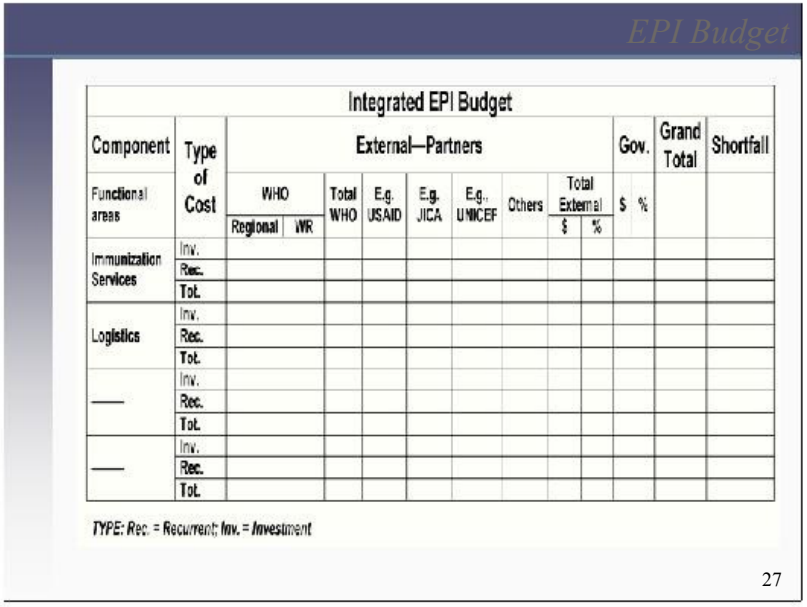






Source:

World
Bank,
2002



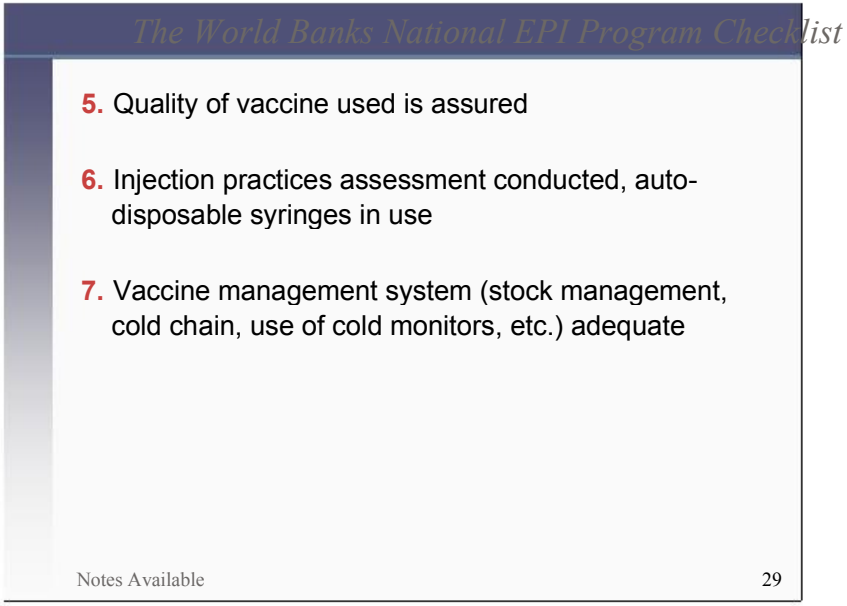
Interagency Coordination

A single, multi-year work plan with major government, donor inputs specified

Inputs by functional area (e.g., logistics, training, surveillance) and year

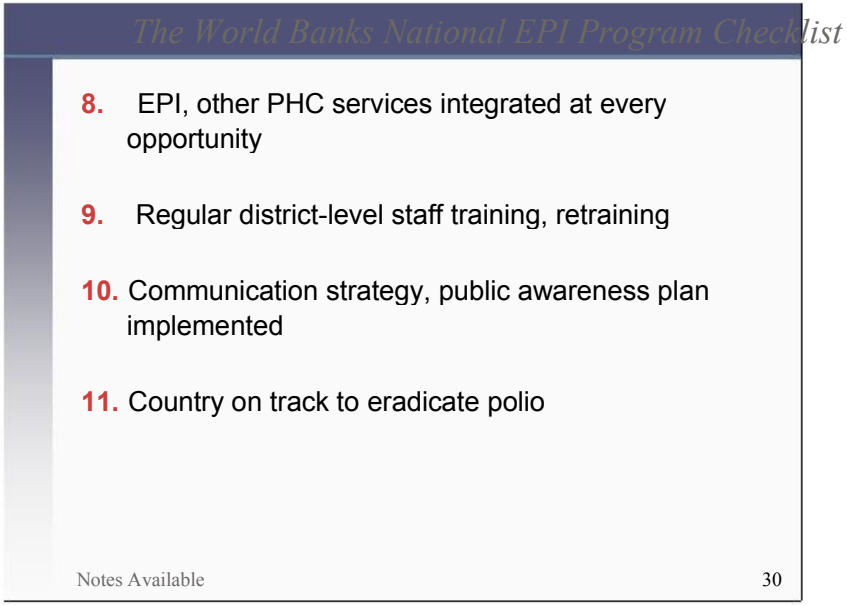
Recurrent, capital costs shown separately

28



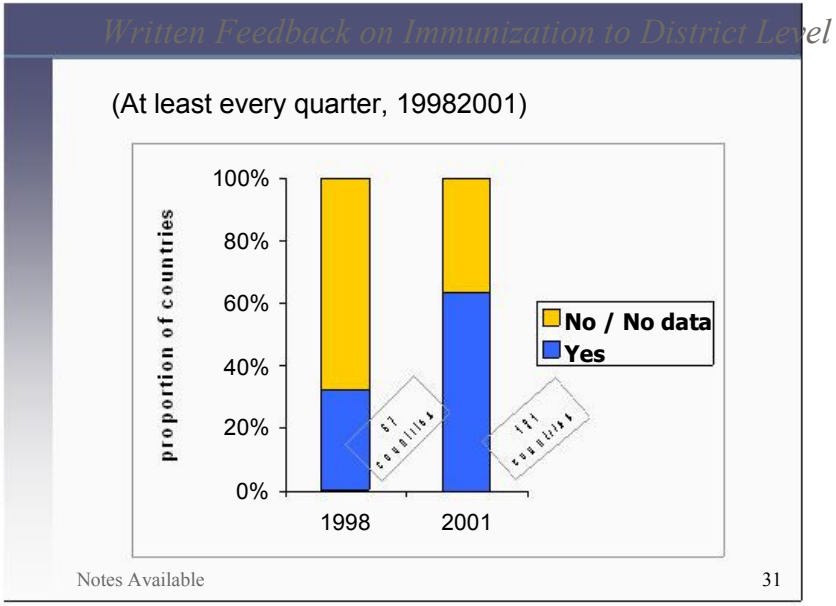
Source:

World
Bank,
2002



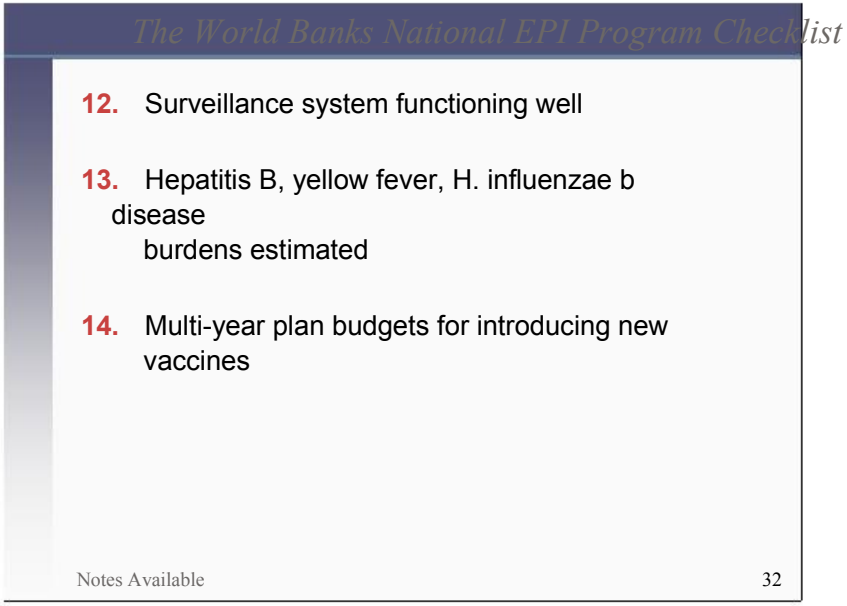
Source:

World
Bank,
2002



Source: WHO/UNICEF joint reporting form, 1998, 2001

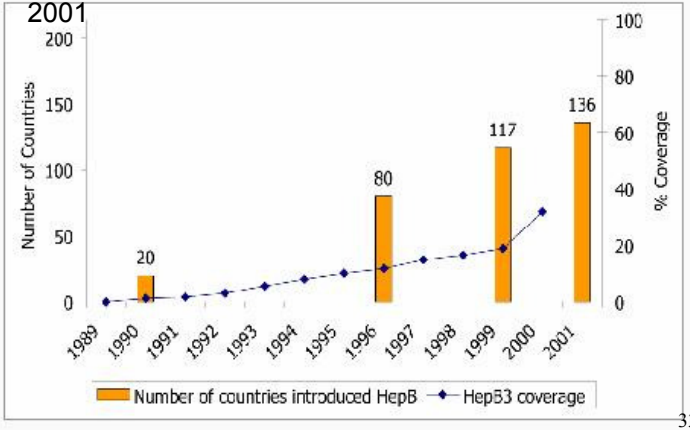
data from 191 WHO member states



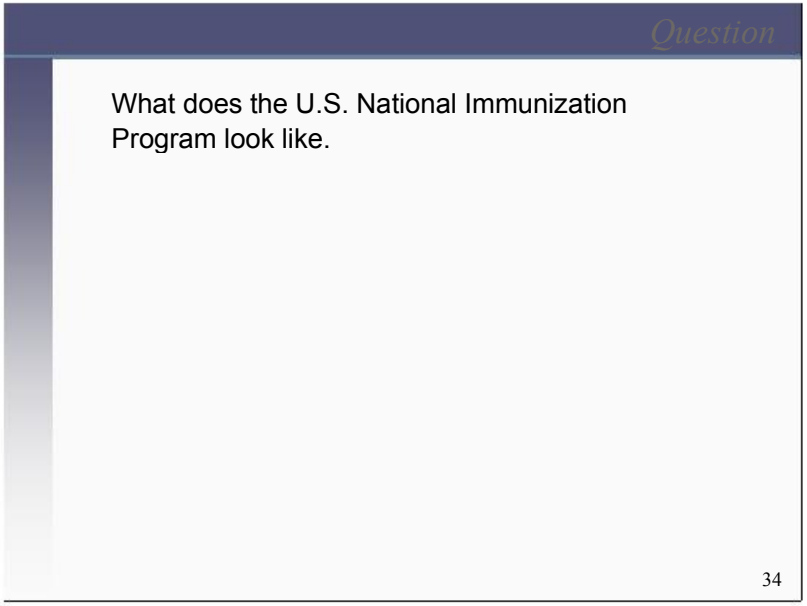
Source:

World Bank, 2002

Number of countries introduced Hepatitis B vaccine and global Hepatitis B3 coverage, 1989 2001



33



A mix of federal, state, and local governmentas well as private sector providers

60% of vaccinations given by private sector in 1999

Increasing private sector share due to increasing coverage by Medicaid and Childhood Health Insurance Program

Continued

U.S. National Immunization Program

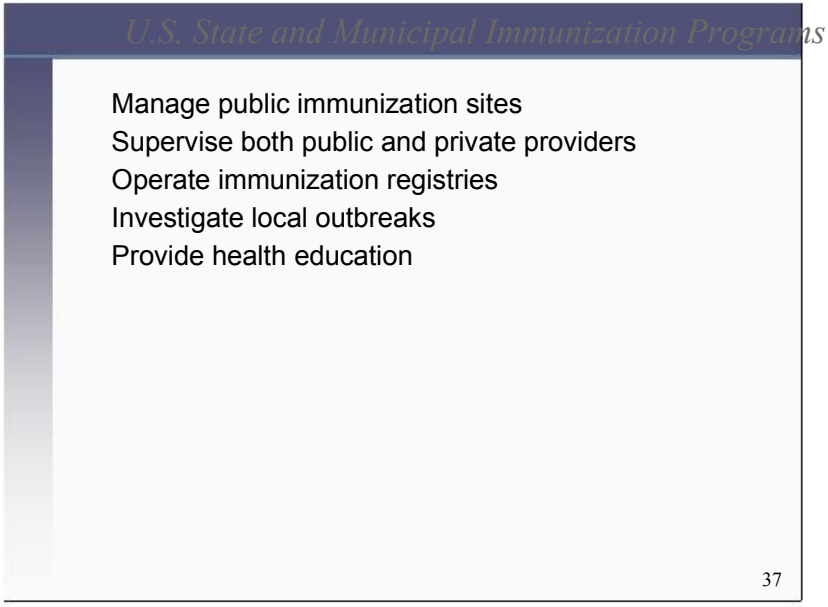
About 80% of all U.S. vaccines are publicly provided; 53% are purchased for states by CDC through the Vaccines for Children Program, begun in 1994

Grants to states and territories to strengthen immunization programs

Continuous epidemiological surveillance, vaccine monitoring, research

Increasing international involvement

36



U.S. National Vaccine Advisory Committee Standards

Immunization services are readily available

No barriers or unnecessary prerequisites to the receipt of vaccines

Immunization services free or for a minimal fee

Providers utilize all clinical encounters to screen for needed vaccines

Providers educate parents and guardians

Providers question parents and guardians about contraindications, advise them of risks, benefits

Providers follow only true contraindications

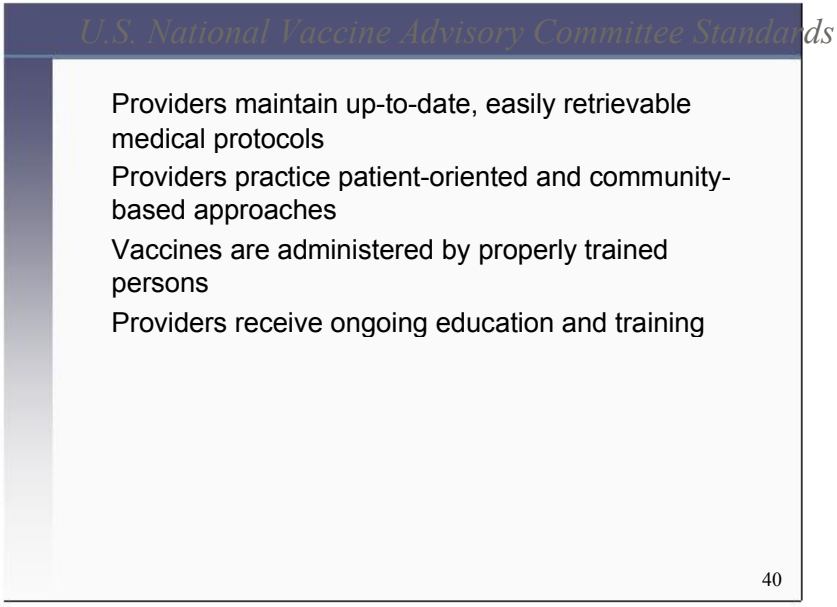
Providers administer simultaneously all vaccine doses for which a child is eligible

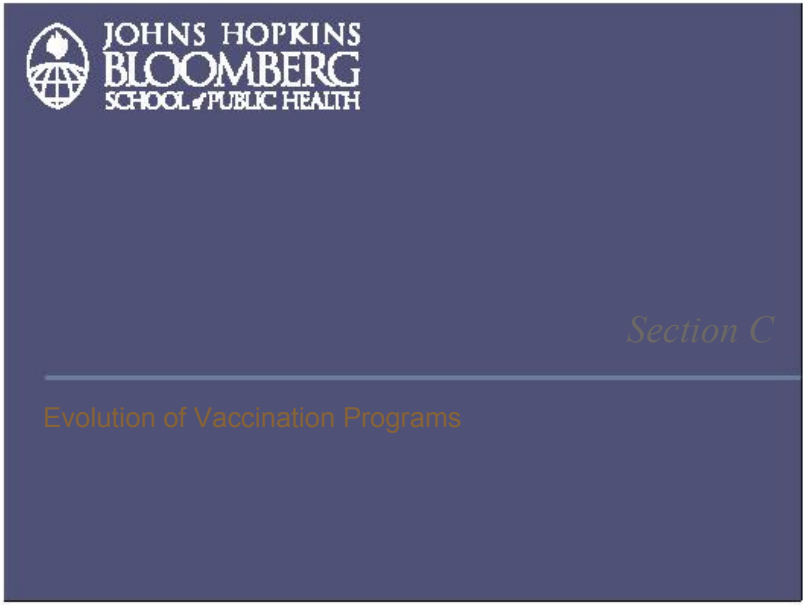
Continued 38

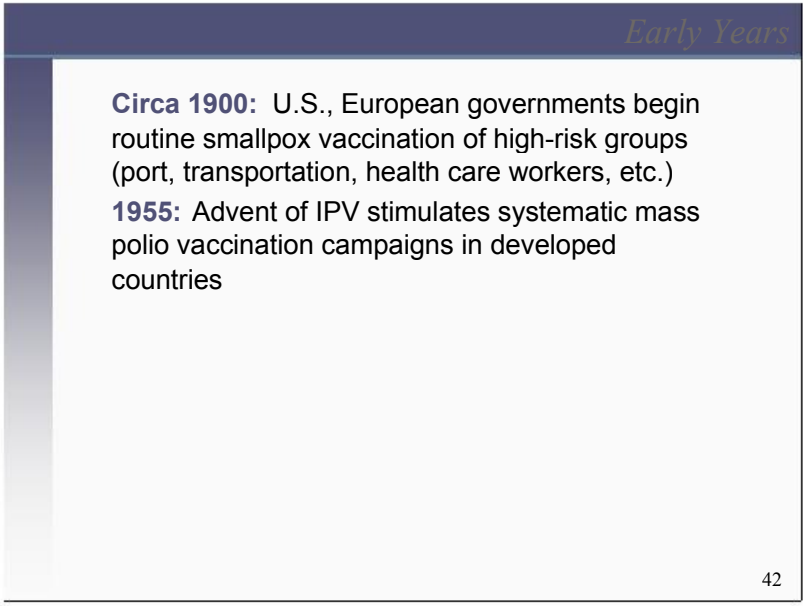
U.S. National Vaccine Advisory Committee Standards

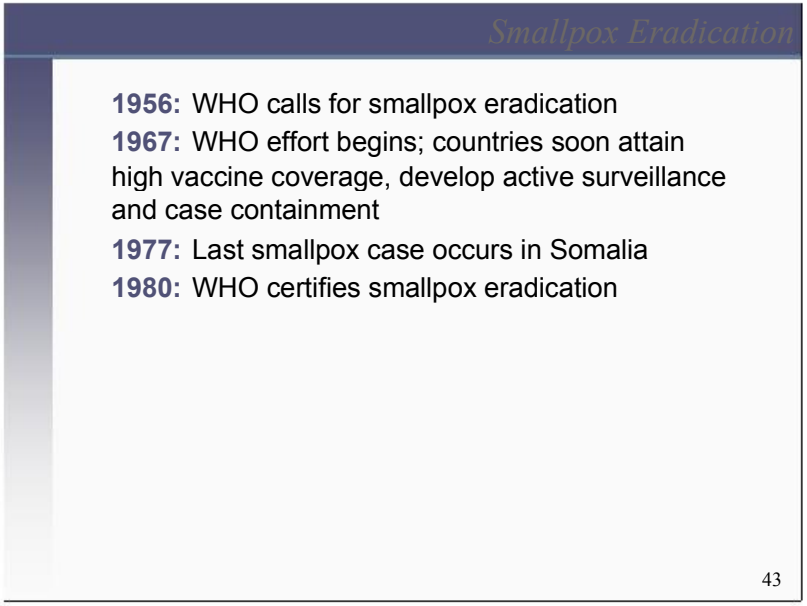
- Providers use accurate, complete recording procedures
- Providers co-schedule immunization appointments with appointments for other child-health services
- Providers report adverse events
- Providers operate a tracking system
- Providers appropriately manage vaccines
- Providers conduct semi-annual audits

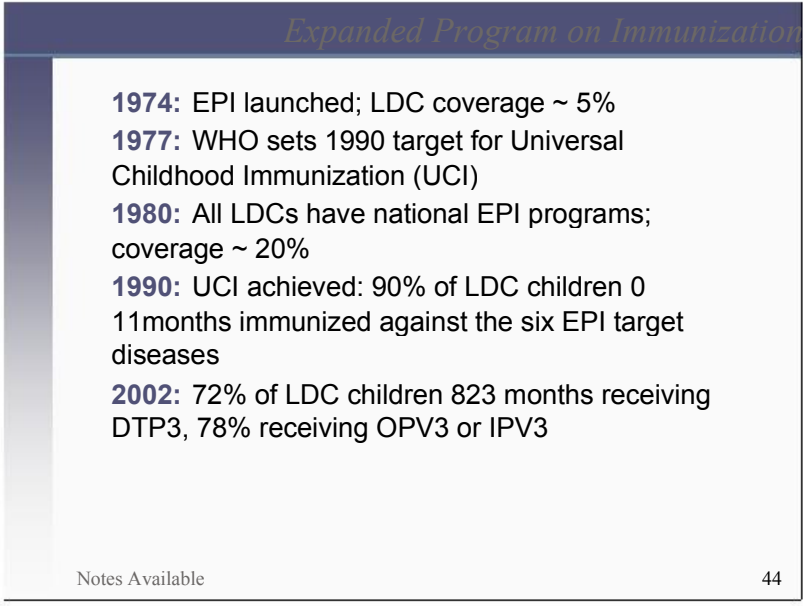
Continued 39











Source:

WHO/UNICEF


Next Target
45

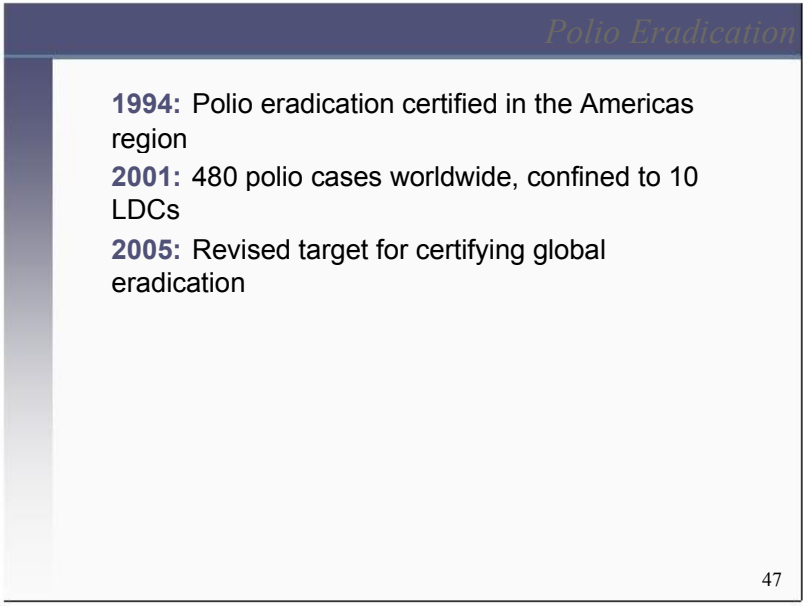
Polio Eradication

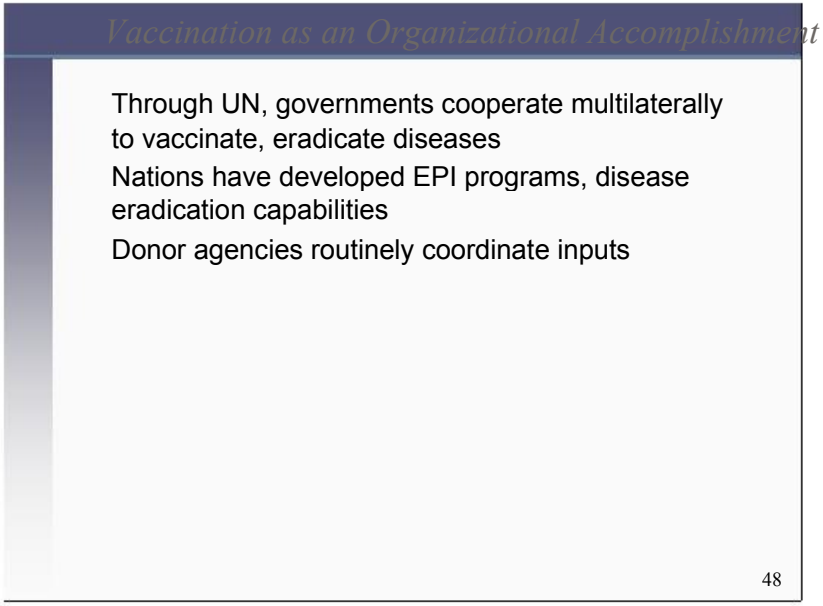
1985: PAHO sets 2000 polio eradication goal for Americas Region

1988: WHO adopts 2000 global eradication goal; polio incidence ~ 350,000 cases/year

1991: Last confirmed wild poliovirus case in the Americas

Continued





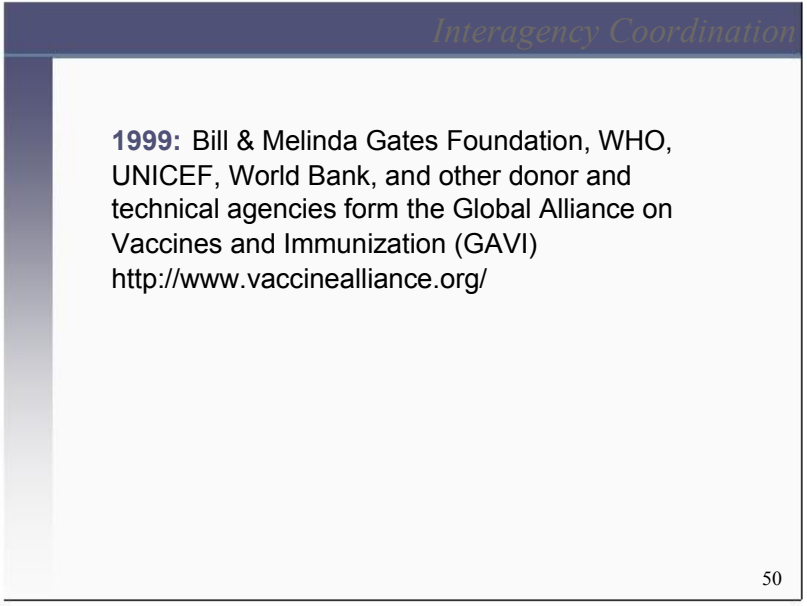
Interagency Coordination

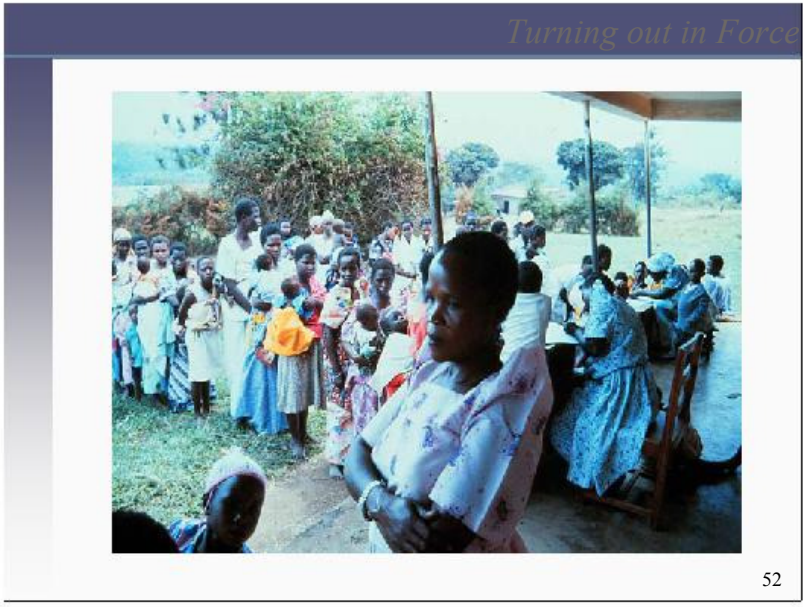
1977: WHO, UNICEF issue Alma-Ata Declaration, which incorporates EPI

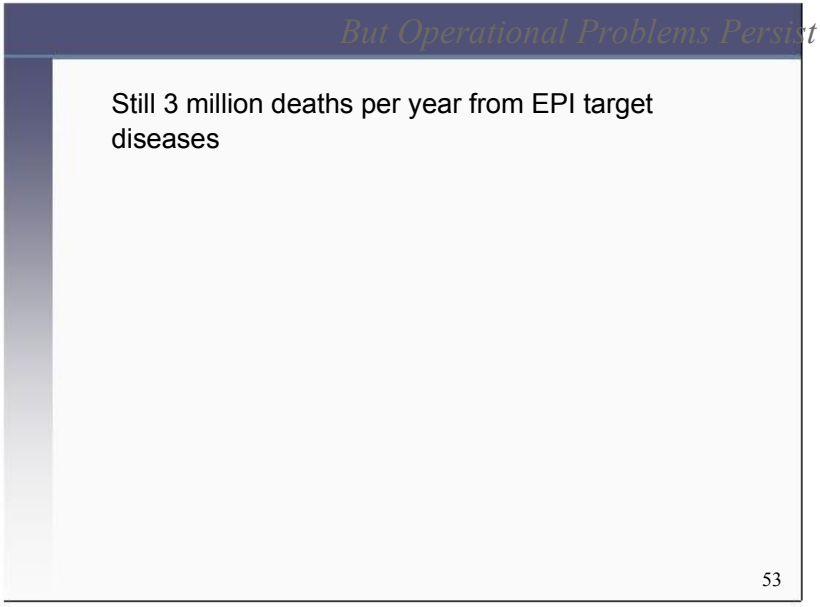
1984: UNICEF, WHO, UNDP, World Bank, and Rockefeller Foundation join forces for UCI1990

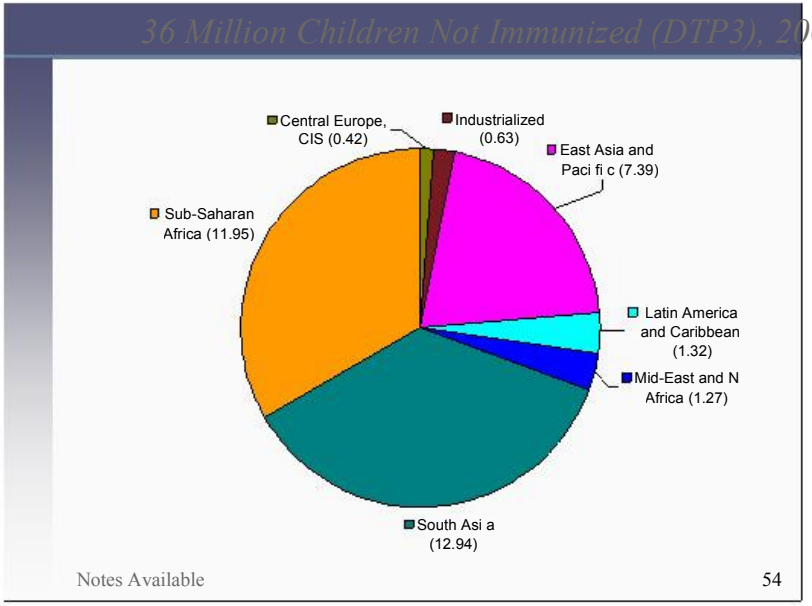
1988: WHO, UNICEF, Rotary International, U.S. Centers for Disease Control form Global Polio Eradication Initiative

Continued 49



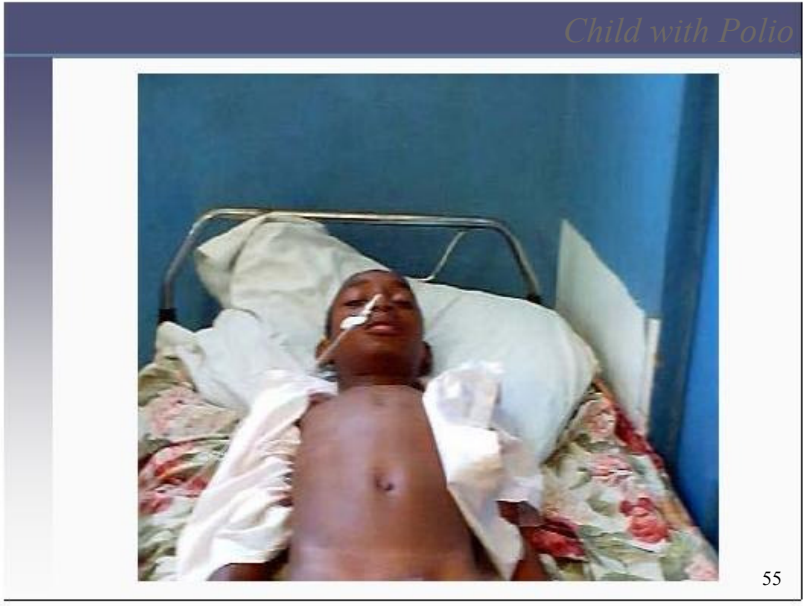

Turning out in Force
52




36 Million Children Not Immunized (DTP3), 2001
Central Europe, CIS (0.42)
Industrialized (0.63)
East Asia and Paci fi c (7.39)
Sub-Saharan Africa (11.95)
Latin America and Caribbean (1.32)
Mid-East and N Africa (1.27)
South Asi a (12.94)
Notes Available
54

Source:

WHO/UNICEF
estimates, 2002


Child with Polio
55

But Operational Problems Persist

Still 3m deaths/yr from EPI target diseases

Expanding vaccination schedule increases client-provider dependency

56

But Operational Problems Persist

Still 3m deaths/yr from EPI target diseases

Expanding vaccination schedule increases client-provider dependency

Increasingly complex delivery systems require more management support

57

Management Is Key

58

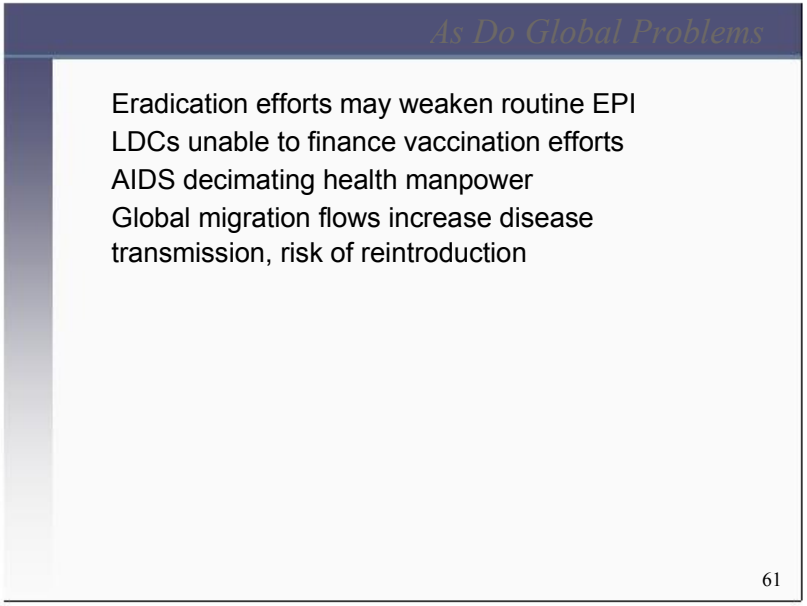
But Operational Problems Persist

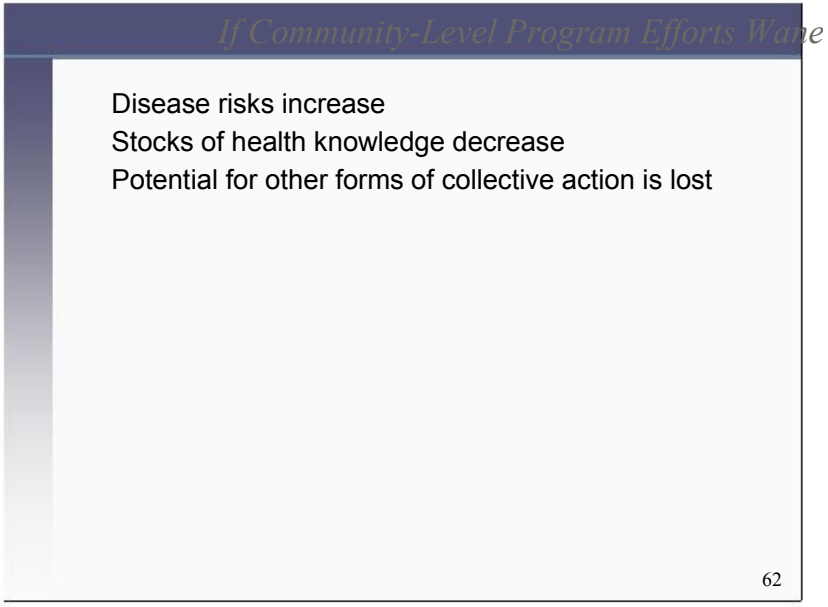
- Still 3m deaths/yr from EPI target diseases
- Expanding vaccination schedule increases client-provider dependency
- Increasingly complex delivery systems requires more management support
- Populations still unvaccinated most difficult

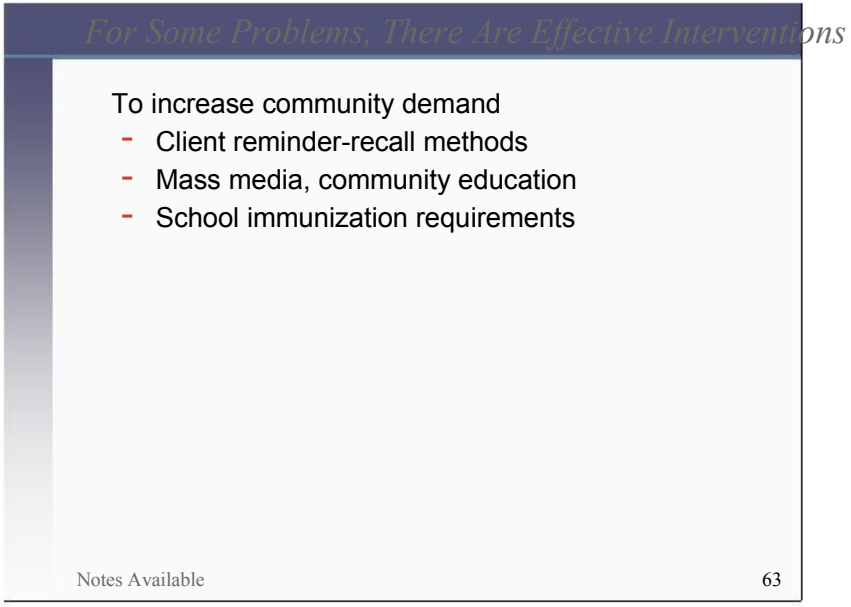
Continued

But Operational Problems Persist

60

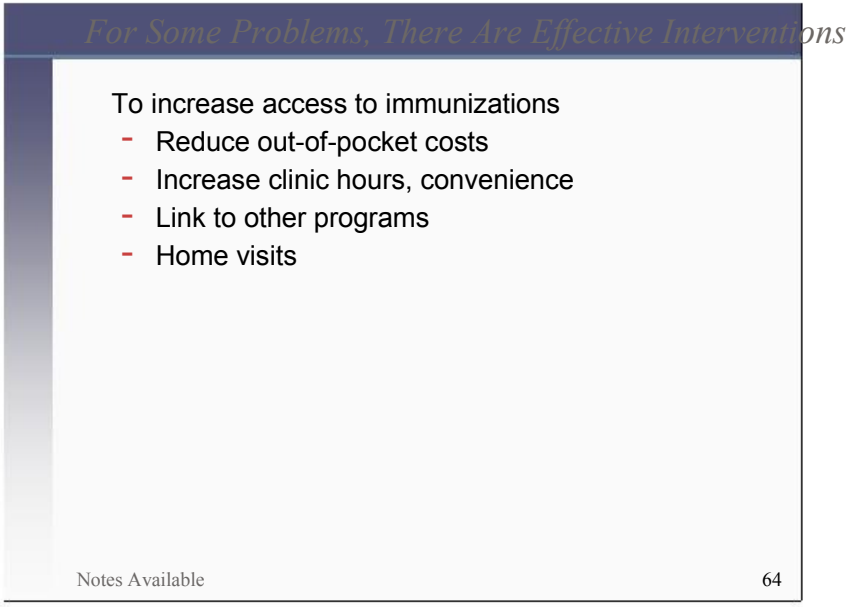

As Do Global Problems
Eradication efforts may weaken routine EPI
LDCs unable to finance vaccination efforts
AIDS decimating health manpower
Global migration flows increase disease transmission, risk of reintroduction
61





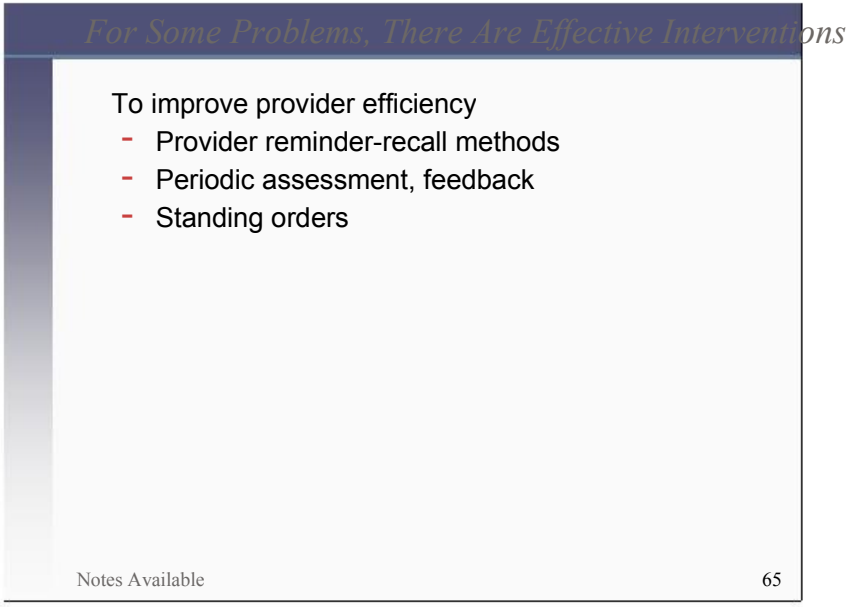
Source: Task Force on Community

Preventive Services, 2000



Source: Task Force on Community

Preventive Services, 2000



Source: Task Force on Community

Preventive Services, 2000

Less Is Known About Sustainability

Once attained, how does the community maintain high vaccine coverage.

Some promising theories to build on

- Collective action
- Social learning
- Trust

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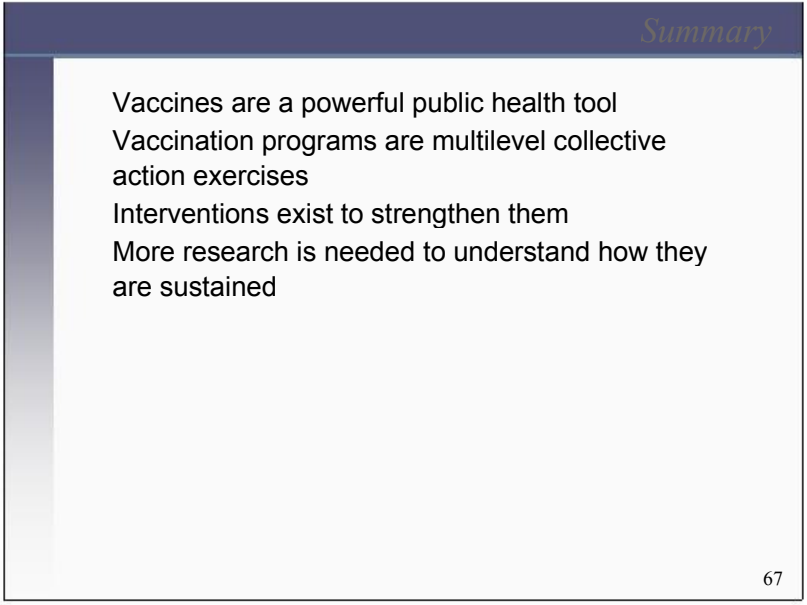
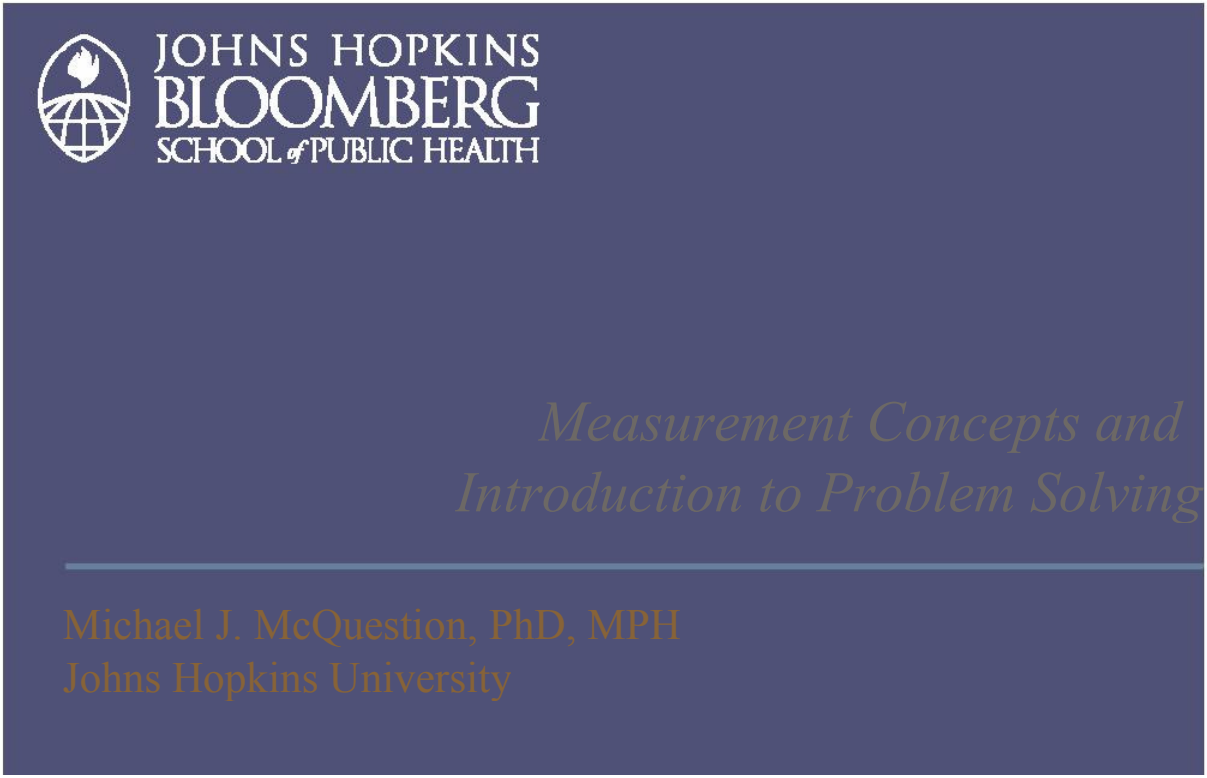


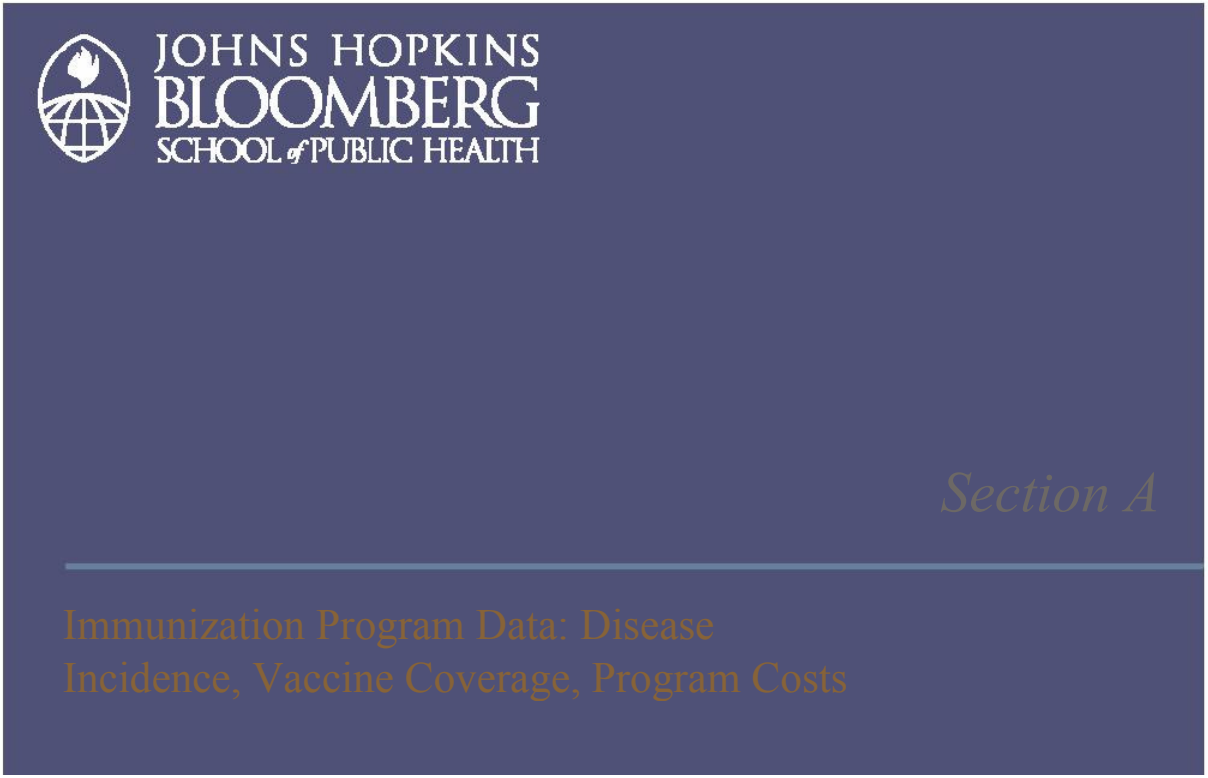


Objectives

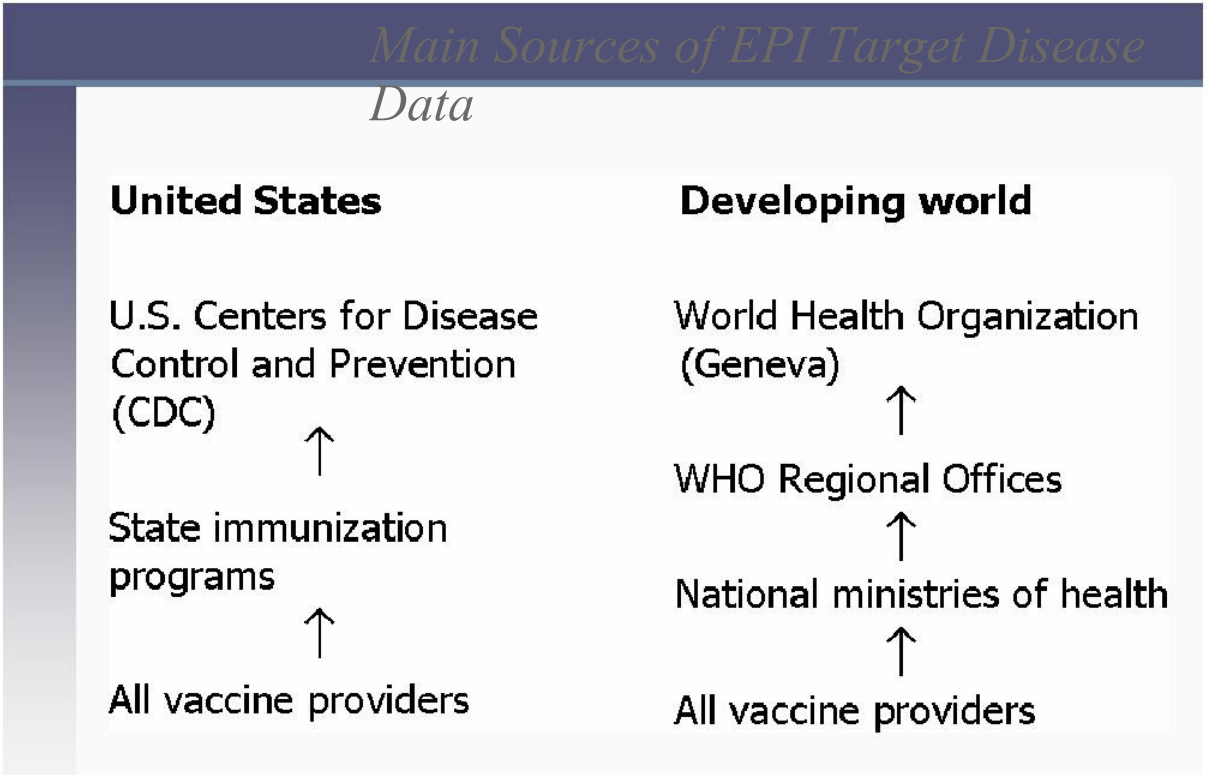
After listening to, viewing, and studying the lecture materials in this course, you will be able to do the following:

- Describe sources of vaccine coverage, target disease, and cost data
- Explain and apply standard immunization program measurement concepts
- Distinguish alternative theories and methodological approaches to problem solving

2



Main Sources of EPI Target Disease Data



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Hallmarks of the U.S. Disease-Reporting System

Decentralized, comprehensive

Redundant state and federal capabilities

Fax and online reporting

Prompt outbreak investigation, feedback (MMWR)

5

Excerpt of CA Measles-Reporting Form

State of California—Health and Human Services Agency

Department of Health Services
DCDC Immunization Branch
2151 Berkeley Way, Room 712
Berkeley, CA 94704

Date Investigation Started |__|__| |__|__| |__|__|
month day year

MEASLES (RUBEOLA) CASE REPORT—CALIFORNIA

County | Case Number

Personal Data

Name | Sex: ☐Male ☐Female | Date of birth |__|__| |__|__| |__|__| month day year | Onset age |__|__| yrs. ☐< 1 year | Address (number, street) | City | ZIP code | Phone ( )

Person reporting case, phone number ( ) | Date reported to county |__|__| |__|__| |__|__| month day year | Physician (if any) phone number ( ) | Hospital (if any) phone number ( )

Ethnicity ☐Hispanic ☐Non-Hispanic ☐Unknown | Country of birth: ☐U.S. ☐Other: _____ ☐Unknown

Race/National Origin ☐White ☐Black ☐American Indian/Alaska Native (Aleut, Eskimo) ☐Unknown

☐ Asian—Please also check one box below:
- ☐ Chinese
- ☐ Japanese
- ☐ Korean
- ☐ Filipino
- ☐ Asian Indian
- ☐ Cambodian (Non-Hmong)
- ☐ Laotian (Non-Hmong)
- ☐ Vietnamese (Non-Hmong)
- ☐ Hmong
- ☐ Thai
- ☐ Other Asian

☐ Pacific Islander—Please also check one box below:
- ☐ Guamanian
- ☐ Samoan
- ☐ Hawaiian
- ☐ Other Pacific Islander

Occupation

Social Security number |__|__|__| - |__|__| - |__|__|__|__|

Clinical and Lab Data

Rash
☐ Yes ☐ No If yes, rash onset date: |__|__| |__|__| |__|__| month day year
Duration: ☐ 1–2 days ☐ 3 days ☐ 4 or more days
Origin on body and spread
Description

Fever
☐ Yes ☐ No
If yes, onset date: |__|__| |__|__| |__|__| month day year
Highest temperature: |_____|
If temperature not measured, did patient's skin feel: ☐ Hot ☐ Warm ☐ Normal ☐ Unknown

Cough
☐ Yes ☐ No

Runny nose
☐ Yes ☐ No

Watery or red eyes or photophobia

6

Hallmarks of Global Disease Reporting System

Historically incomplete, delayed in many countries

Exceptions: smallpox, polio, measles (active surveillance + outbreak investigation)

Steady improvements in recent years

7

WHO Vaccine-Preventable Diseases Monitoring System

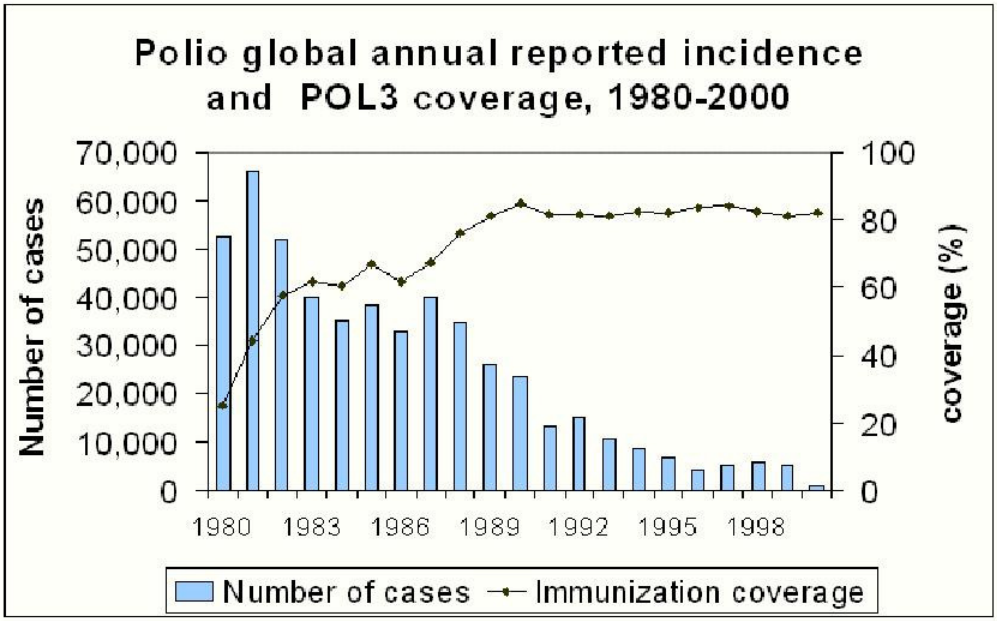
Includes the following indicators

- Coverage rate time series by vaccine
- Annual numbers of cases EPI target diseases
- Proportion of districts reporting
- DPT3 dropout rates

http://www.who.int/vaccines-surveillance/intro.html

8

Global Surveillance Systems



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Main Sources of Vaccine Coverage Data

United States

- National Immunization Survey: 1994present
- National Health and Nutrition Examination Survey (NHANES): 1960present
- State registries

Developing world

- World fertility surveys (197284, 60 LDCs)
- Demographic and health surveys (1984 present, ~200 done so far in over 70 countries)
- Ministries of health, UN statistics

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United States National Immunization Survey

- Surveys 78 Immunization Action Plan areas
- Produces annualized coverage estimates for 10 antigens
- Identifies particular high-risk groups
- Telephone survey + provider record check
- Santoli et al (1999) used 1997 NIS to estimate proportion of vaccinations given through Vaccines for Children Program
- Using 1999 NIS data, Luman et al (2001) showed that 75% of incompletely immunized children were only one visit away from completing their immunization

schedules

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Sources of Immunization-Cost Data

- Administrative record reviews
- Vaccine manufacturers
- Living Standards Measurement Surveys (World Bank, selected LDCs)
- Other surveys

12

Immunization Costs

United States

- Lieu et al (2000) computed the costs of streptococcus pneumonia in a cohort of U.S. children
- Result: routine immunization against the disease would save $760m/year

Developing world

- San Sebastian et al (2001) compared hospital-based to community health worker-based delivery strategies in one region of Ecuador
- Result: CHWs immunized children more cheaply

than
hospitals

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Two Key Macro EPI Measures

Equity: does the program reach all groups.

Sustainability: can high performance be maintained.

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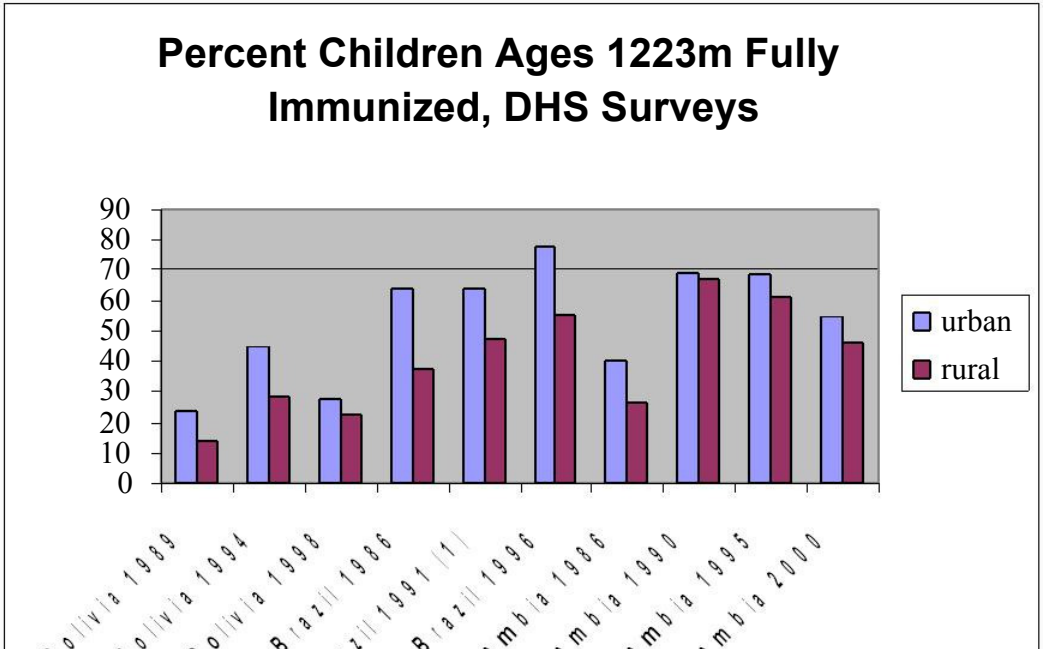
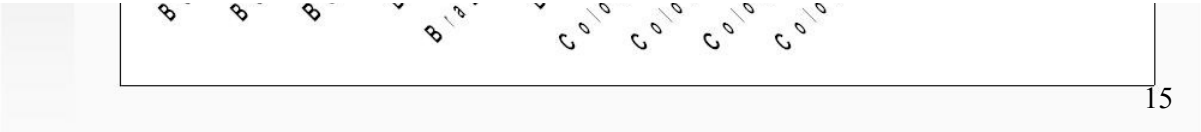
Equity and Sustainability: Three Latin American Countries

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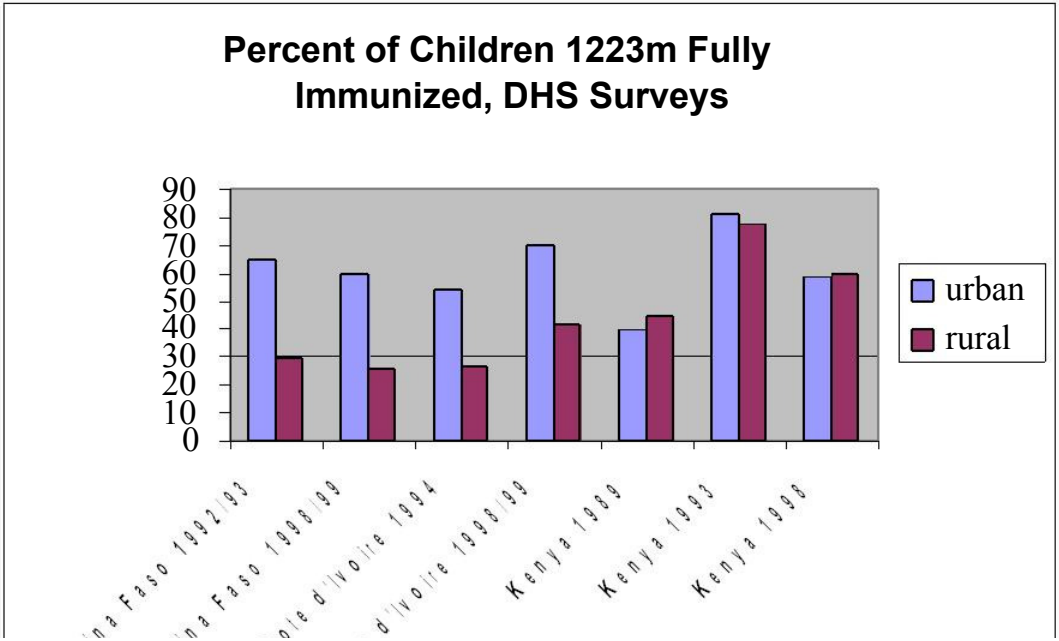
Equity and Sustainability: Three African Countries

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Some Key Micro-Level Measures

Efficiency, affordability, cost-effectiveness
Access (cost, convenience)
Community demand
Quality of services

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Generating Local Immunization Data

Surveys can retrieve data from three sources

- Vaccination cards
- Parental recall
- Medical and administrative records

The veracity of the data varies by context

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Local Data

United States

- Bolton et al (1998) compared vaccination card, parental recall, and medical records data for a cohort of 525 Baltimore children
- Results: parents overestimated and the cards underestimated immunization status

Developing world

- Onta et al (1998) studied administrative EPI data from Nepal
- Results: district health offices, peripheral health workers routinely inflate vaccination reports

Continued 19

Local Data

Later in the course, we will learn more about several methods to generate local data, including:

- Cluster sample surveys
- Lot quality assurance
- Provider databases (CASA Program)

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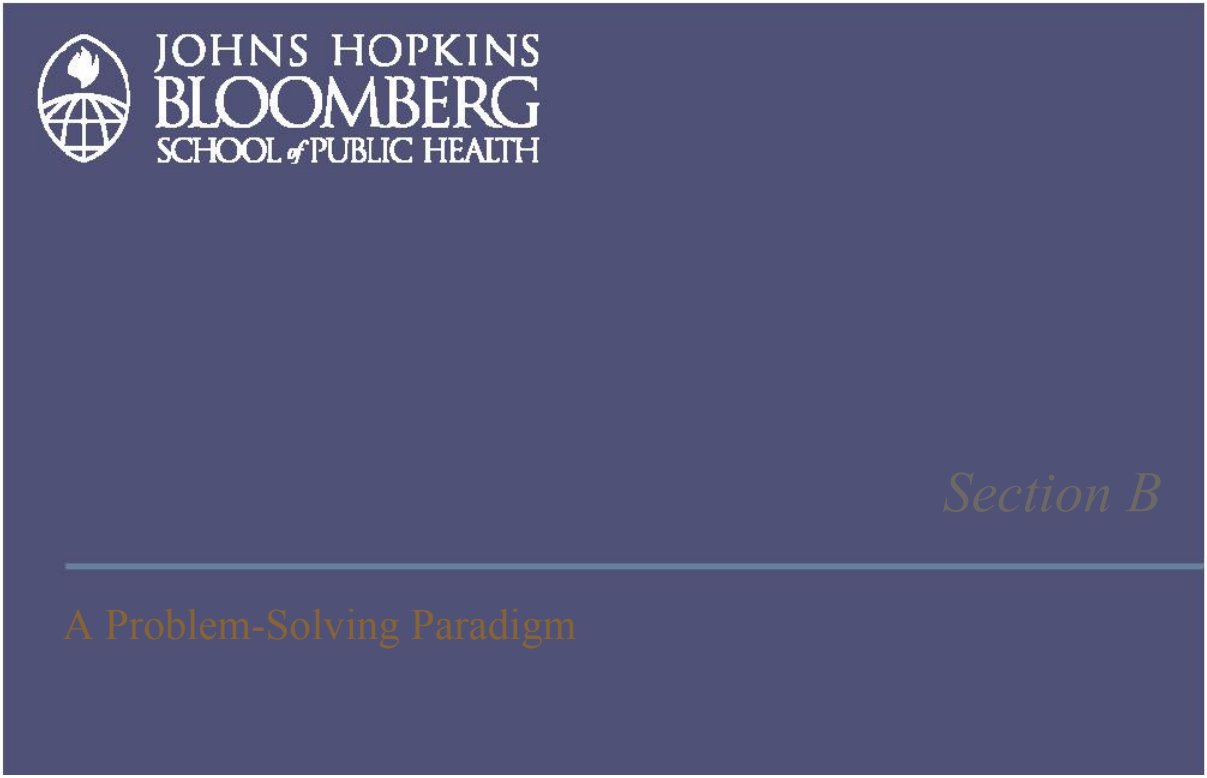

Problem Solving Paradigm:

This is but one approach; use what works for you!

- Define problem
- Measure its magnitude
- Conceptualize its determinants
- Strategize interventions
- Implement and evaluate

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First Step in Problem-Solving: Define the Problem

Someone identifies a problem and calls for a solution

Who selects it and how it is chosen affect both the intervention and its resources

Why the concern arises and how the problem is defined frame the choice of strategy

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Vaccination

an expression of trust between patient and provider [that is] strongly shaped by the management practices of [health care] organizations (Gilson, in press)

Continued 24

Vaccination

an expression of trust between patient and provider [that is] strongly shaped by the management practices of [health care] organizations (Gilson, in press)

A health input parents choose conditional on their resources and competing wants (Victor Fuchs, 1996)

Continued 25

Vaccination

an expression of trust between patient and provider [that is] strongly shaped by the management practices of [health care] organizations (Gilson, in press)

A health input parents choose conditional on their resources and competing wants (Victor Fuchs, 1996)

Basic health services, including essential immunization, are a human right (WHO 2001)

Continued 26

Vaccination

Which statement is correct.

All of them, for different reasons

There are many ways to frame a problem

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Alternative Problem Frames

Our children are unimmunized because:

- Funding has been cut (political)
- Parents dont care (moral)
- Health workers dont do their job (organizational)
- Disease risk is minimal (epidemiologic)

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The Frame Sets the Parameters for the Solution

Management frame

- *Problem: low* immunization utilization
- *Solution: improve* quality of services

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Alternative Frames

Economistic frame

- *Problem: parents not willing to pay*
- *Solution: reduce vaccination costs*

Continued 30

Sociological frame

- *Problem: vaccine coverage low in some* communities
- *Solution: mobilize target communities*

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Problem Definition

Few problems can be conceptualized in purely logical, factual terms

Problem definition always entails practical value-judgments

Each frame strives to be logical but invariably imposes its particular parameters (theoretical boundaries) and value judgments

Continued 32

Problem Definition

The fact that immunizing children is problematized across disciplines and cultures points to an underlying value judgment that it is important

Given the above, a robust problem-solving approach should be:

- Reflexive, making value judgments explicit
- Evidence-based

In this course, we will use materials drawn from three frames of reference:

- Epidemiological
- Economistic
- Sociological

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Epidemiological Concepts

Individual

- Exposure
- Case
- Risk factors
- Participation

Population

- Endemicity
- Prevalence, incidence
- Contextual factors
- Coverage

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Step Two: Measure the Magnitude of the Problem

Defining problems using different frames

- Taps different dimensions
- Reveals different measurement approaches
- Can lead to more robust solutions

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Epidemiologic EPI Measures

No. cases EPI target disease x
No. inhabitants

% communities with = 80% children 1223m fully immunized

No. households with child 1223m fully immunized
No. households with child age 1223m

% health facilities reporting AFP cases weekly

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Economic Concepts

Rationality
Heterogeneous preferences
Marginal utility
Substitutability
Markets: supply-demand equilibria

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Economic EPI Measures

Efficiency

- $/child vaccinated

Cost-effectiveness

$/child 1223m fully immunized, strategy 1

$/child 1223m fully immunized, strategy 2

Viability

- $ collected/$ spent on EPI

Continued 38

Economic EPI Measures

Equity

$$\frac{\text{\% lowest income quartile fully immunized}}{\text{\% highest income quartile fully immunized}}$$

Cost-benefit

$$\frac{\text{\$/immunization against disease x}}{\text{\$/case EPI target disease x}}$$

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Sociological Concepts

Individual

- Attributes: Ascribed, attained
- Beliefs: Self-efficacy, Perceived vulnerability
- Behaviors
- Reference groups, social networks

Group-level

- Social structure: strata, heterogeneity, inequality
- Institutions, norms
- Collective action
- Communities

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Sociological EPI Measures

% communities with local health committees meeting at least quarterly

Whether local health committee controls local health resources

No. volunteer-days contributed for local vaccination activities

No. consecutive years community has = 80% children 1223 months fully immunized

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Note That Some Concepts Are Operationalized Differently

Example: sustainability

- Epidemiologic: program maintains high coverage
- Economic: program is self-financing
- Sociological: community reproduces vaccination behaviors, norms

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Low-Income Countries and Routine Vaccines: Financing

Low-Income Countries Financing 25% or More of Routine EPI Vaccines*

Country	% Financed	Country	% Financed	Country	% Financed	Country	% Financed
Burkina Faso**	100	Nepal	53	Tanzania	10	Congo	0
Chad**	100	Uganda	50	Zambia	10	Eritrea	0
Ghana	100	Mongolia	40	Armenia	7	Guinea-Bissau	0
Honduras	100	Turkmenistan	36	C. Afr. Rep.	4	Lao PDR	0
Mali**	100	Gambia	30	Kenya	3	Liberia	0
Nicaragua	100	Moldava, Rep.	29	Sierra Leone	3	Mauritania	0
Nigeria	100	Cameroon	27	Burundi	2	Mozambique	0
Pakistan	100	Guinea	25	Malawi	2	Myanmar	0
Senegal**	100	Haiti	25	Afghanistan	0	Rwanda	0
India	98	Lesotho	25	Angola	0	Somalia	0
Côte d'Ivoire**	95	Benin	15	Azerbaijan	0	Tajikistan	0
Niger**	80	Ethiopia	15	Bhutan	0		
Togo	80	Madagascar	10	Bosnia/Herz.	0		
Viet Nam	73	Sudan	10	Cambodia	0		

* The routine vaccines of the expanded programme of immunization (EPI) are diphtheria, measles, pertussis, polio, tuberculosis, and tetanus. Yellow fever is part of EPI coverage in countries at risk in Africa and South America. "Low-income country" in this list represents GNP per capita of $785 or less.
** These countries have benefited from grants from the European Union.

Sources for both lists: Vaccine finance, UNICEF; income levels: World Bank.

Step Three: Conceptualize Problem Determinants

Once framed, a problem is analyzed to identify and conceptualize its determinants

This process necessarily entails two steps:

- Theorizing
- Making causal inferences

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Definition

Theory A particular set of propositions, postulates and assumptions devised to explain some set of facts or phenomena

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Examples of Relevant Theories

Epidemiology
- Germ theory
- Epidemic models

Economics
- Free market/ consumer choice
- Human capital model

Sociology
- Symbolic interactionism
- Organizational behavior
- Collective action

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Theories

A range of theories can be invoked to solve vaccination program problems, and they generally do not overlap

What the theories do have in common is the notion of causality

- For every problem (effect) there must be a cause (which hopefully can be mitigated)

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Four Conditions for Causal Inference

1. Association: cause, effect (X,Y) are correlated
2. Time order: cause X must precede effect Y
3. Nonspuriousness: X, not Z, is the true cause
4. Mechanism: X theoretically linked to Y

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Causal Inference

In practice, identifying a particular cause of immunization program problems is difficult

- The problems have multiple causes
- Many causes are unobservable

As a result, most empirical research fails to meet all causal inference criteria

The methodologically strongest are experiments or quasi-experiments that randomize subjects and compare the outcomes of treatment, control groups

Problem: most programs are full-coverage, so exposure cannot be controlled

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Next Lecture

In the next lecture, we will learn more about how problem-solving interventions are designed, implemented, and evaluated

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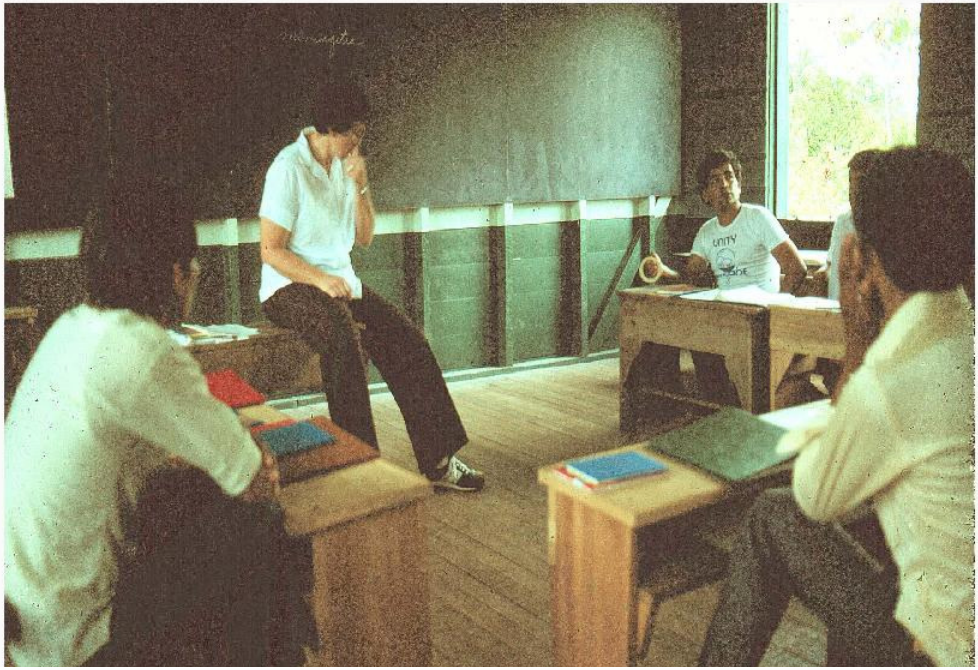
Summary



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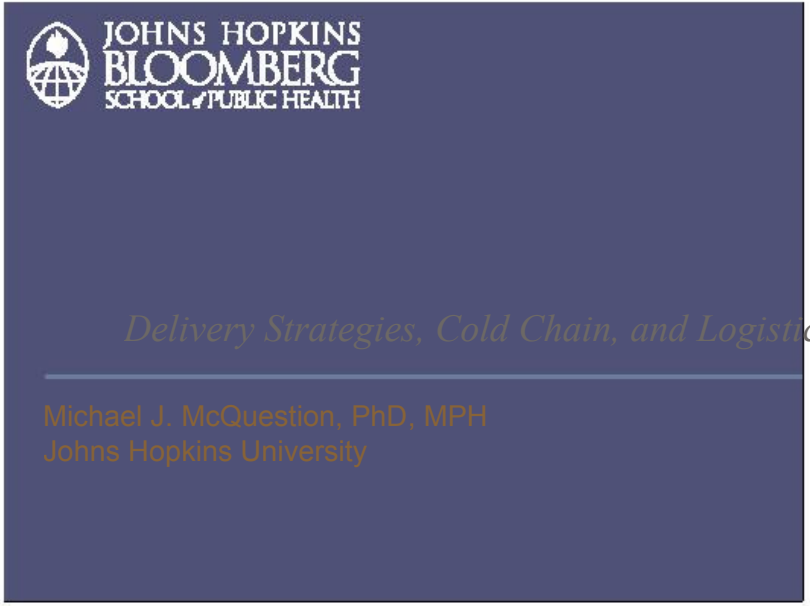
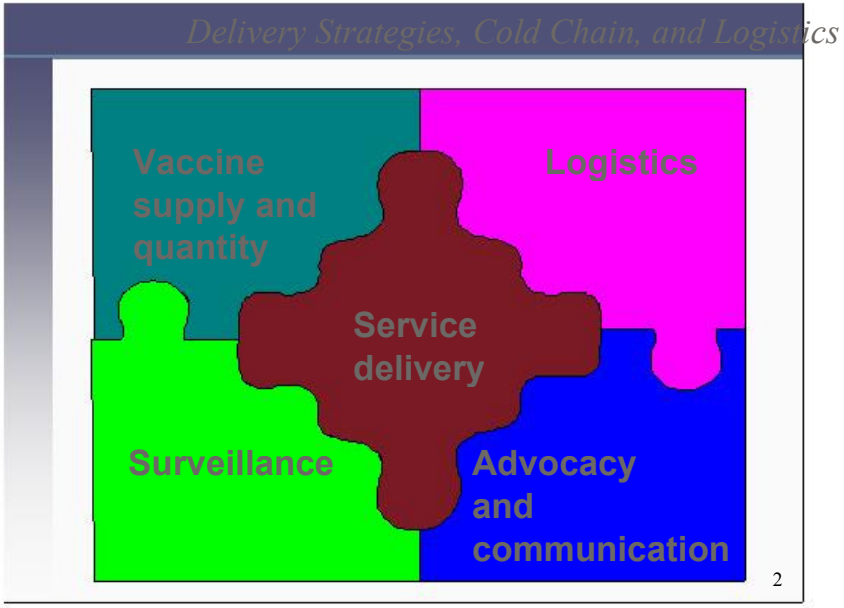
Summary

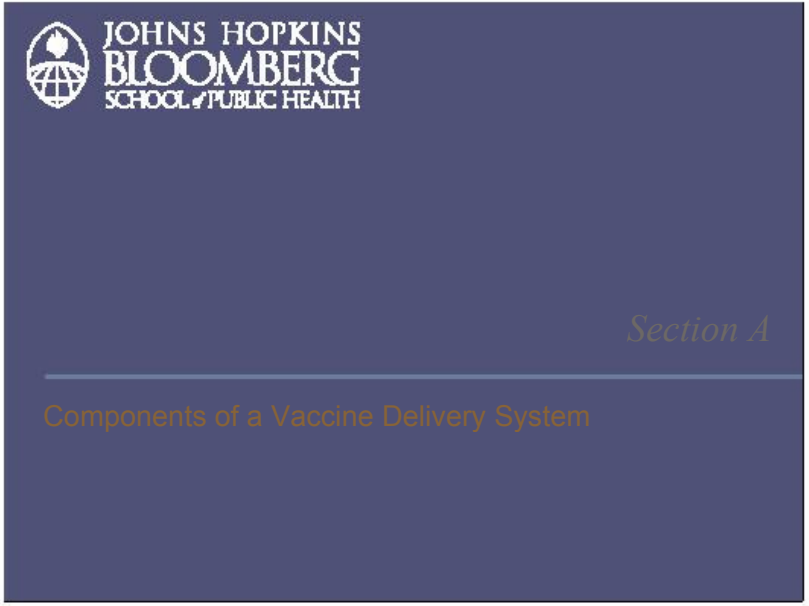
High-quality immunization data are increasingly accessible

Immunization problems can be framed and measured from several disciplinary perspectives

Theories rarely overlap and causal inferences are rare in problem solving







Components of a Vaccine Delivery System

- Strategies for hard-to-reach populations
- Vaccine and surveillance logistics
- Injection safety
- Cold chain
- Data quality
- These components characterize every vaccination program
- Programs in the U.S. and developing countries use different strategies to achieve them
- Over time, the strategies are converging

4

Vaccine Delivery in the U.S.

Vaccines are delivered routinely through a mix of public and private fixed facilities

Traditionally, a state responsibility

Significant federal inputs (Childhood Immunization Initiative) following 1991 measles epidemic

Private insurance: covers 60% of children ages 0 5, but only half cover vaccines

HMOs: give about 25% of all U.S. child immunizations; virtually all cover vaccines

Vaccines for Children Program (1994present)

- Gives free vaccines to 35% of all infants
- 1/3 of providers are public, 2/3 private

Continued 5

Vaccine Delivery in the U.S.

High-risk groups least likely to be immunized
- Inner-city neighborhoods
- Low-income
- Uninsured
- Racial and ethnic minorities

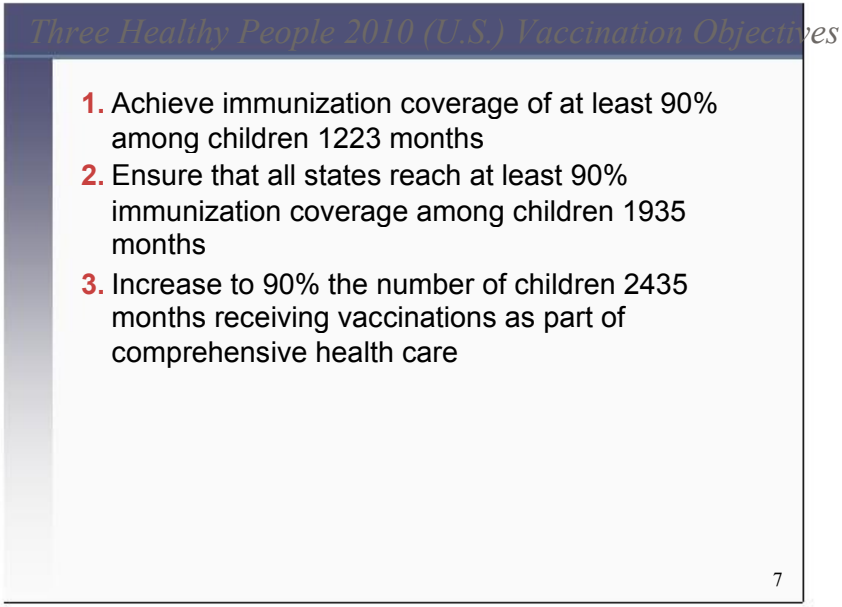
Vaccines: federal (CDC) purchasing and safety oversight

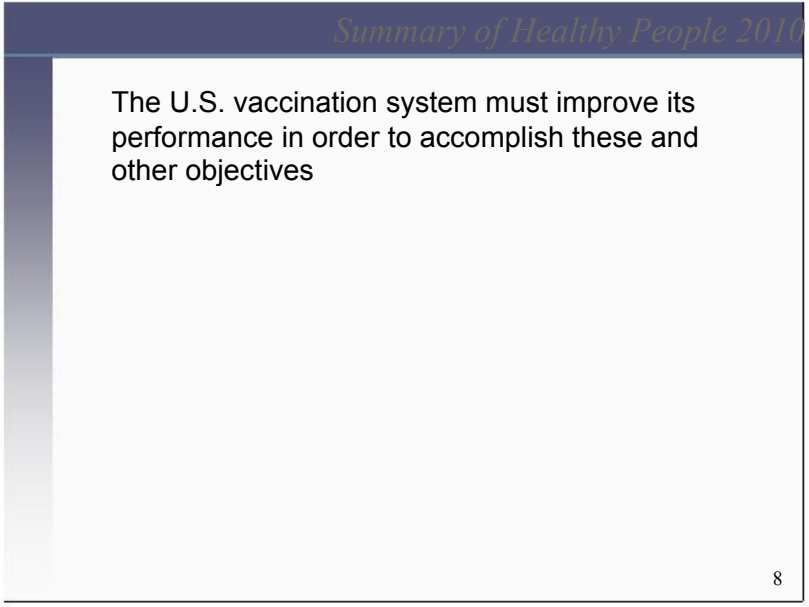
Specimens: CDC, state laboratories

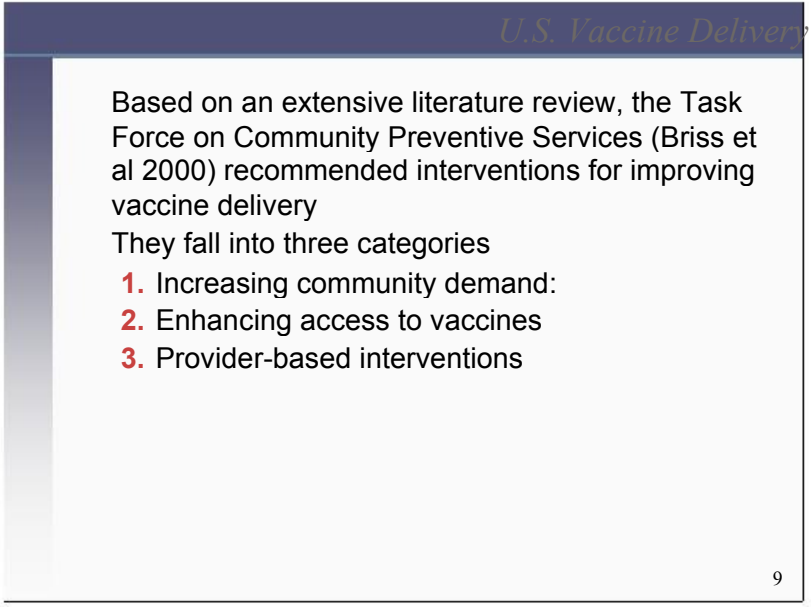
Cold chain: vaccines, drugs fully integrated

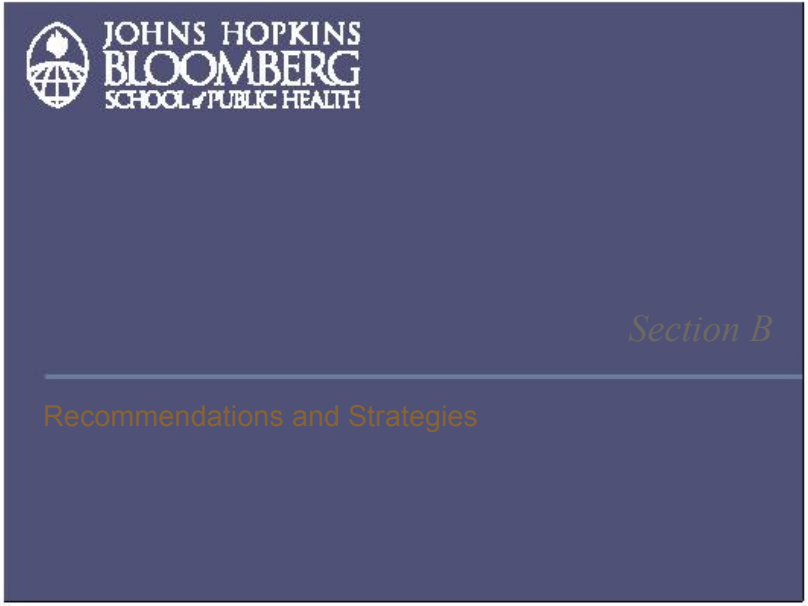
Data quality: standard CDC supervision protocols, provider and state registries

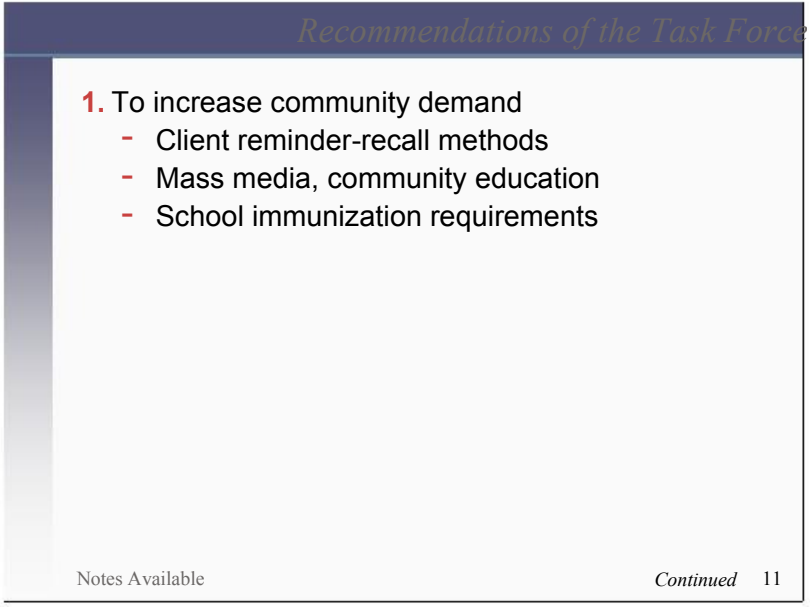
6





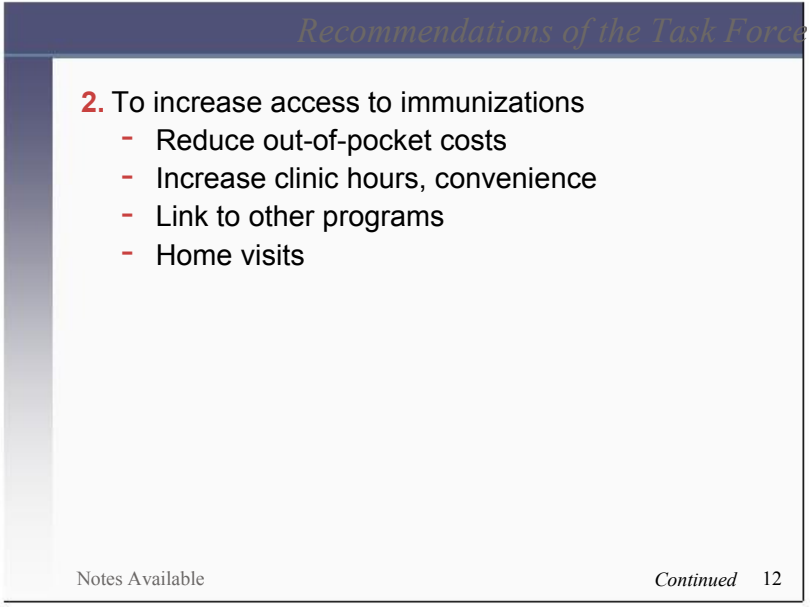






Source: Task Force on Community

Preventive Services, 2000



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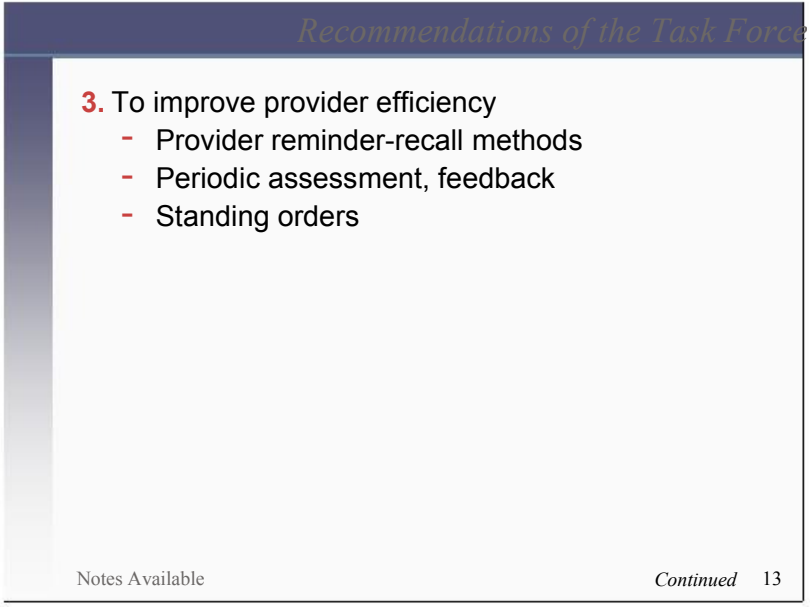

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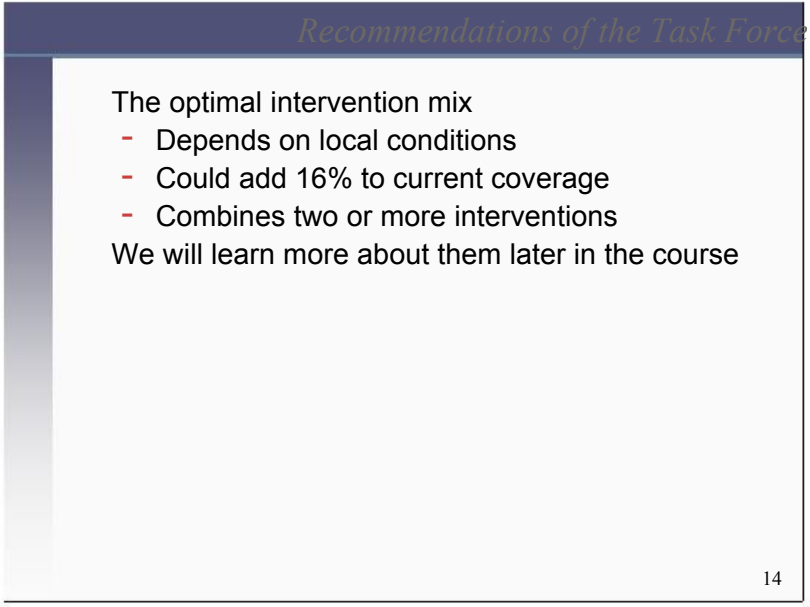

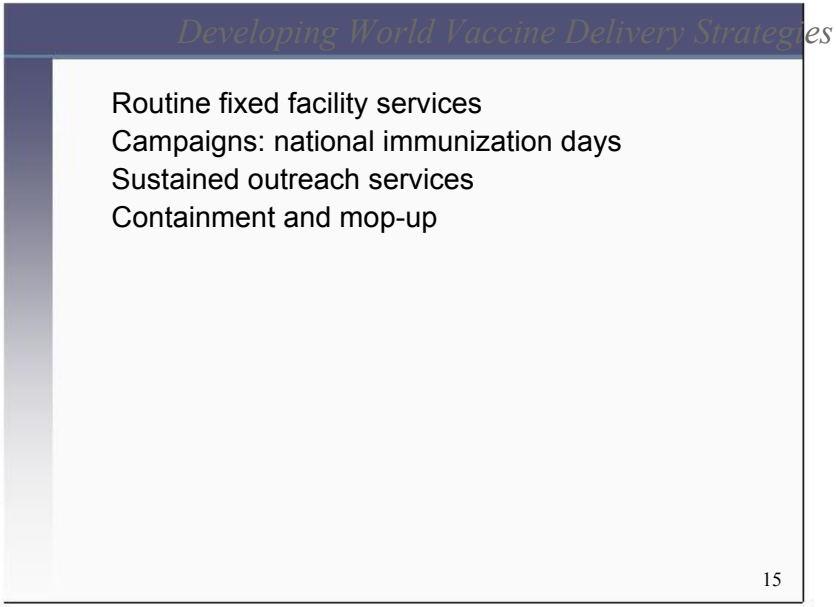
Developing World Vaccine Delivery Strategies
Routine fixed facility services
Campaigns: national immunization days
Sustained outreach services
Containment and mop-up
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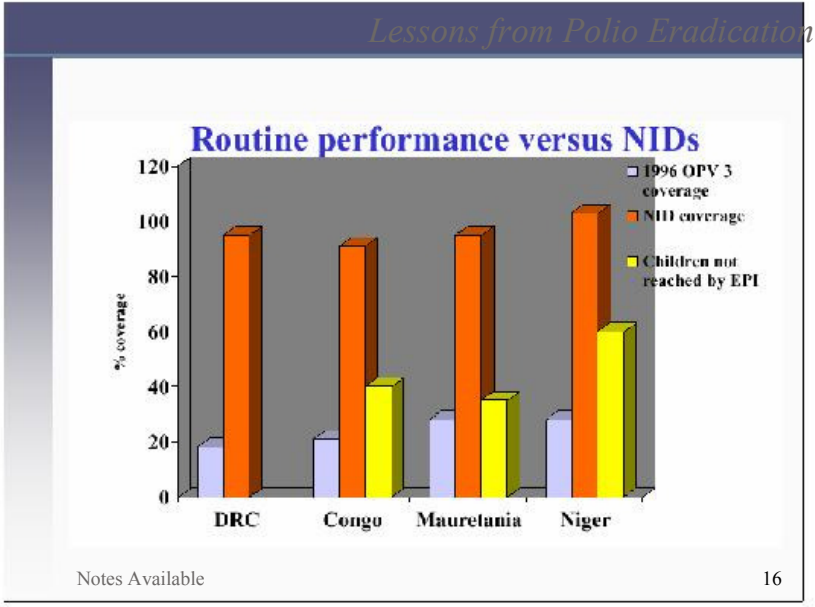

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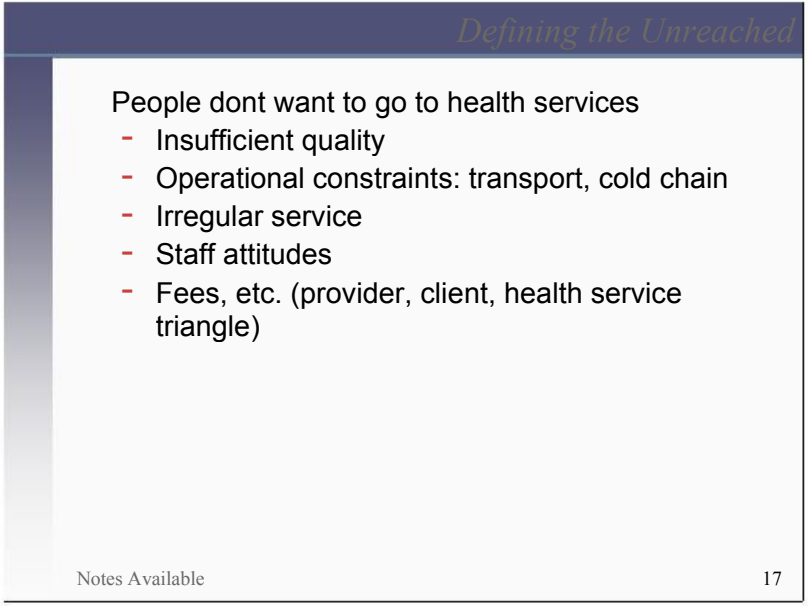
WHO



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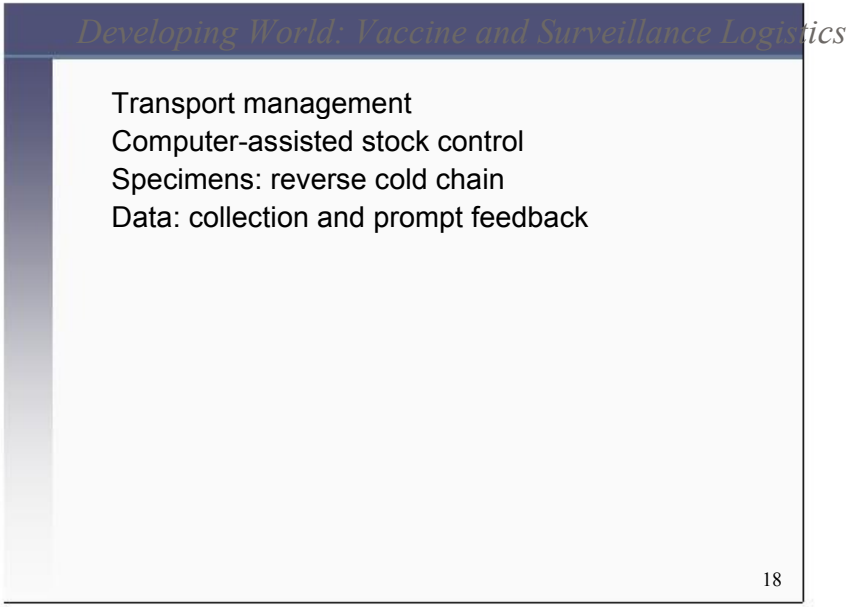
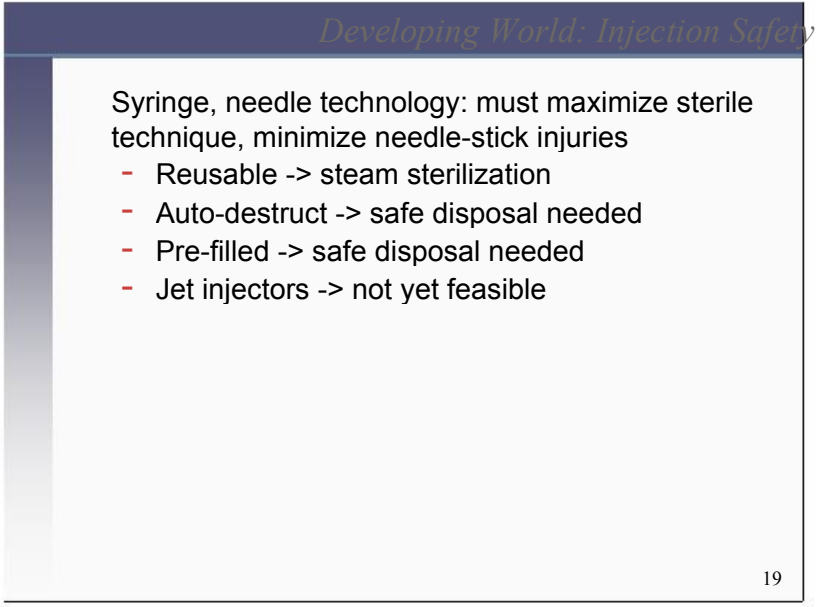
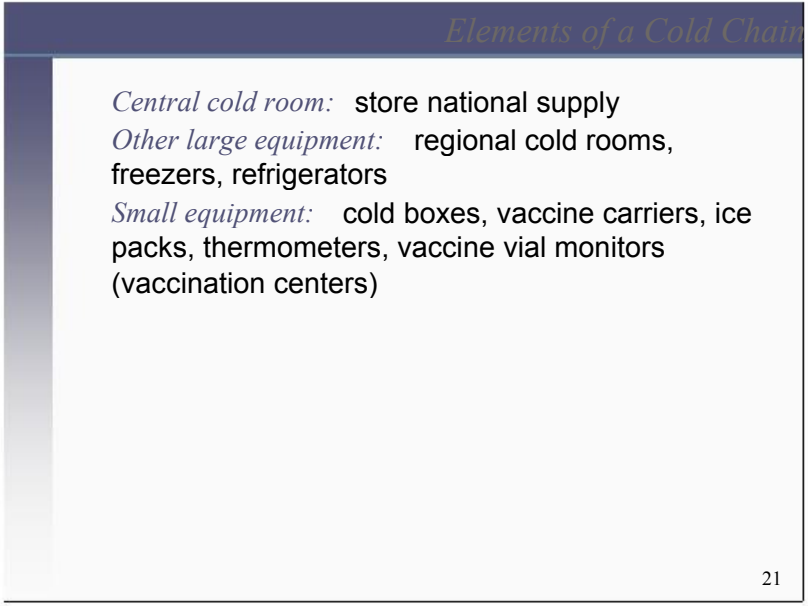






The Fast Cold Chain

Problem: distribute viable vaccines as far from the routine cold chain as possible

Useful for eradication efforts

Consists of vaccine boxes, carriers, ice packs and vaccine vial monitors

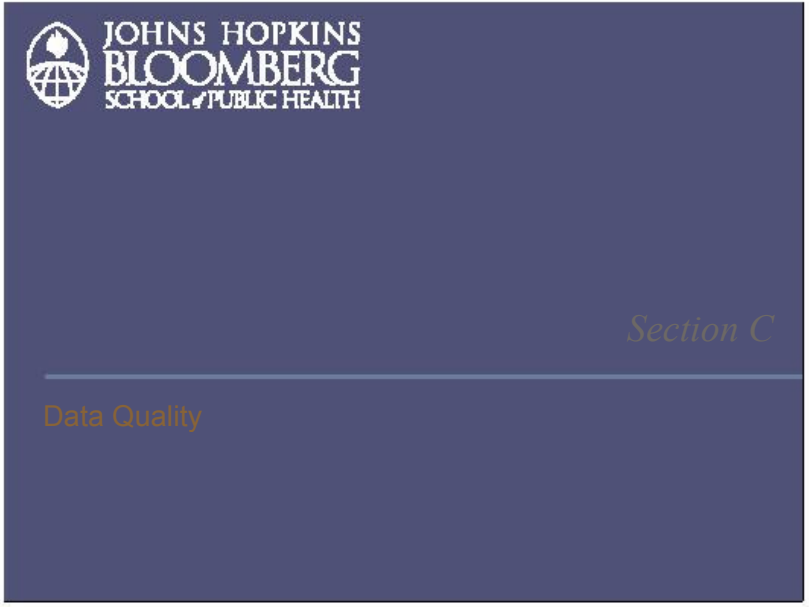
Continued 22

Cold Chain

After finishing this lecture, please visit the following link for a cold chain vignette from West Africa:

http://seattlepi.nwsource.com/africa/infographics/coldchainjourney.asp

23



Data Quality

Countries cannot depend forever on DHS, other surveys for reliable vaccine coverage estimates

Donors need to know reported data validity

Solution: Data Quality Audit (DQA)

- Assess reporting system
- Identify remedial action

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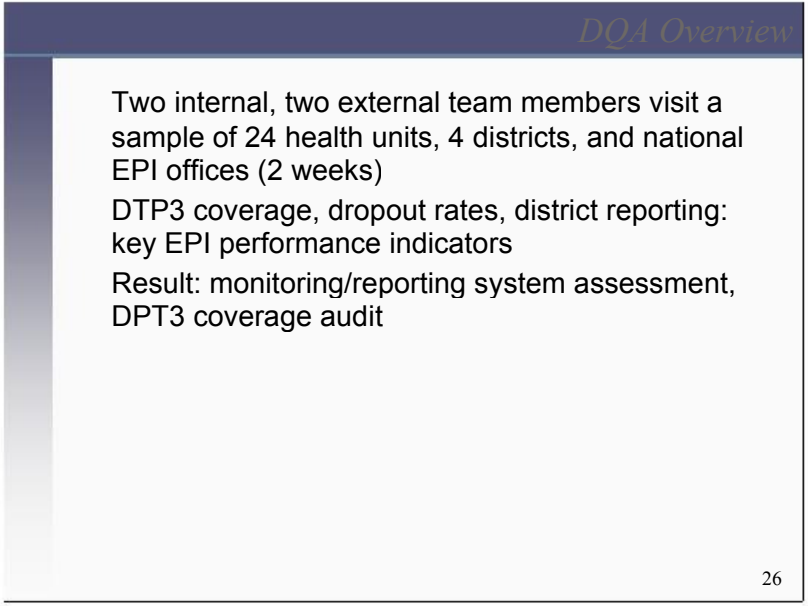

Example of a DQA Measure: National Quality Index Score

Five components

1. Recording practices
2. Data storing, reporting
3. Monitoring, evaluation
4. Denominators
5. System design

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Two Sample Indicators

Two sample indicators used in the scoring of recording practices at national level

- **Indicator #1:** is the current ledger book up-to-date for DTP vaccine.
  (Up-to-date= all receipts and issues entered within 24 hours)
- **Indicator #2:** does each report from the audit year received from the four selected districts have the date of receipt stamped or written on it by the national office.
  (If >50% of the four selected districts, score yes; if <100%, discuss need to have dates, check other reports awaiting processing)

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DQA Quality Index Score

Similar indicators are measured at national, district, and health unit levels for all DQA measures
Results are tabulated, adjusted for the level of errors, and summarized in a series of Excel tables and charts

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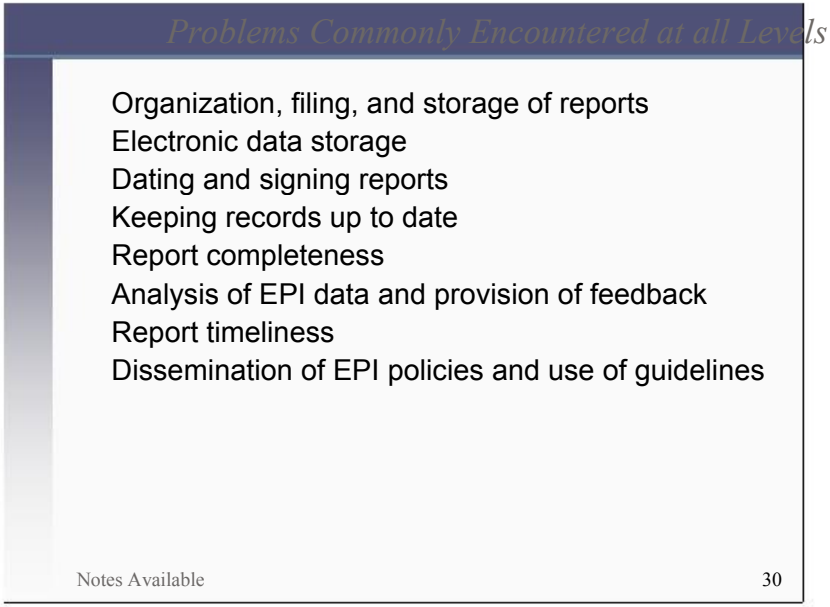

Source:

GAVI

Problem Solving

We have considered the first three steps of the problem-solving paradigm

- Define problem
- Measure its magnitude
- Conceptualize its determinants
- Strategize interventions
- Implement and evaluate

Now lets consider the next two steps by applying them to common vaccine delivery problems

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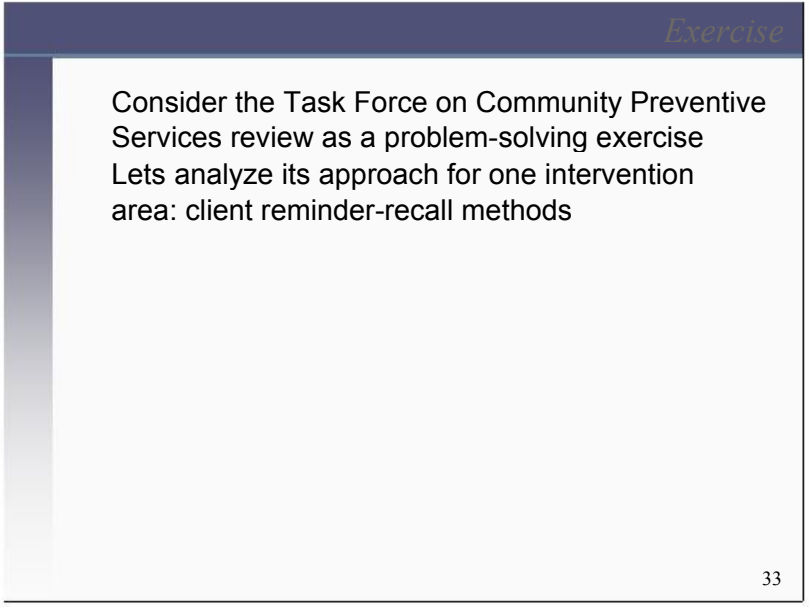


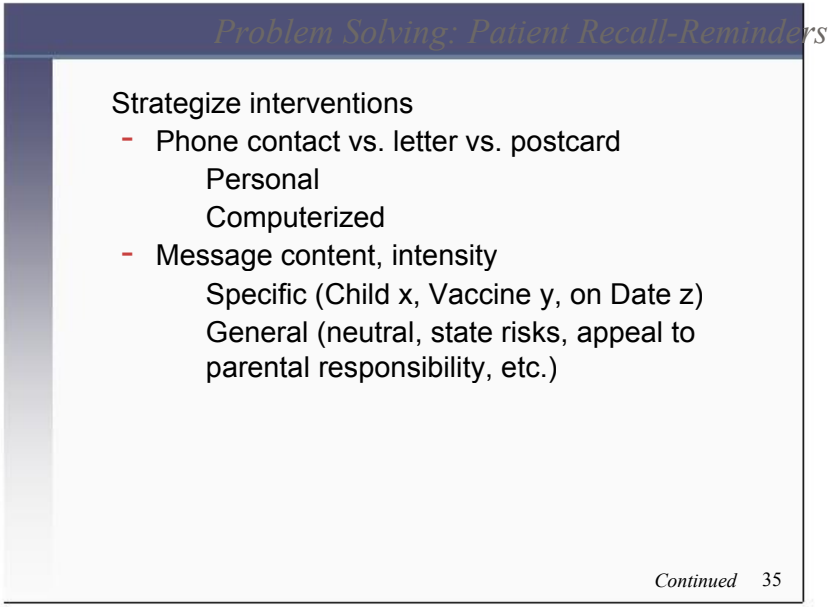
Problem Solving: Patient Recall-Reminders

Problem definition
- Parents forget which vaccinations their children needand when they need them

Magnitude
- 12% of potential coverage

Determinants
- Complexity of vaccination schedule (cause)
- Provider willingness to send reminders
- Technique, content of messages

Continued 34



Problem Solving: Patient Recall-Reminders

Implement and evaluate
- 42 studies judged methodologically adequate

Conclusions
- Phone, letter, postcard equally effective
- Intense messages get best response
- Cost-effective: $9/vaccination

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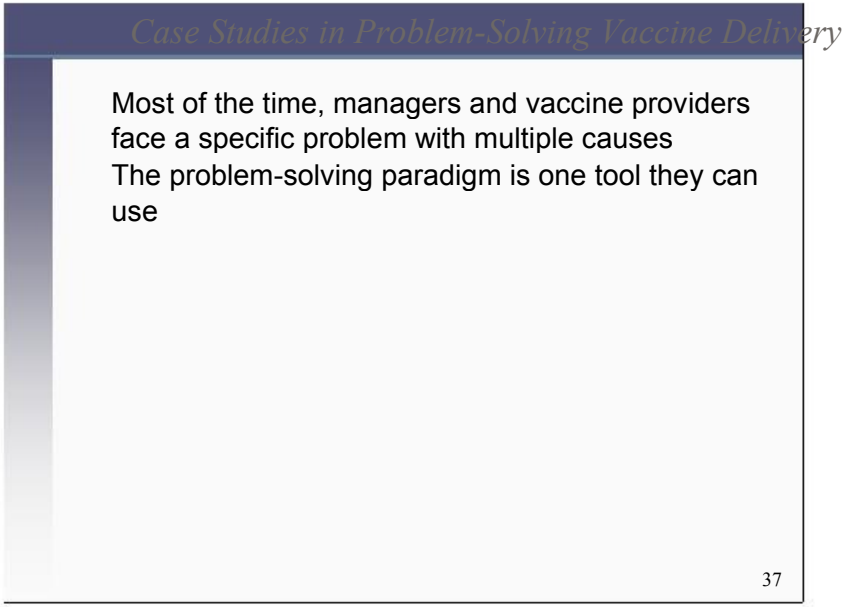
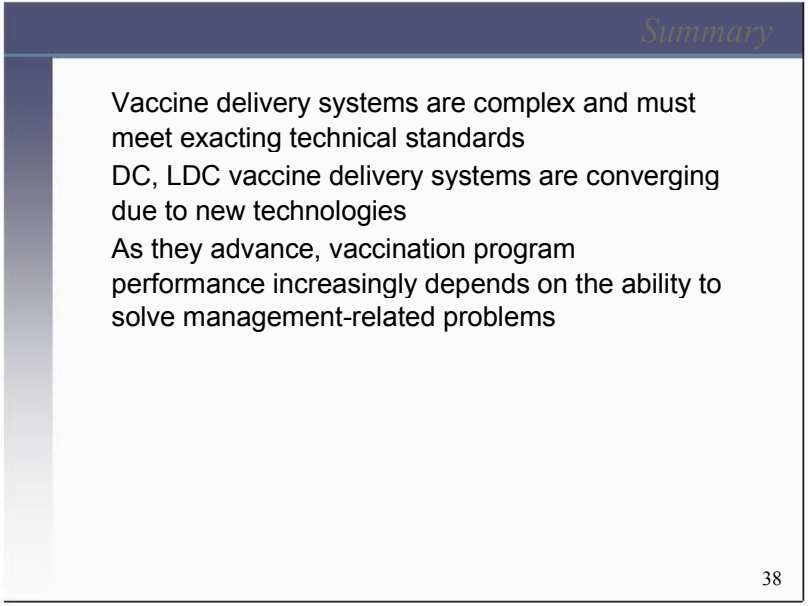
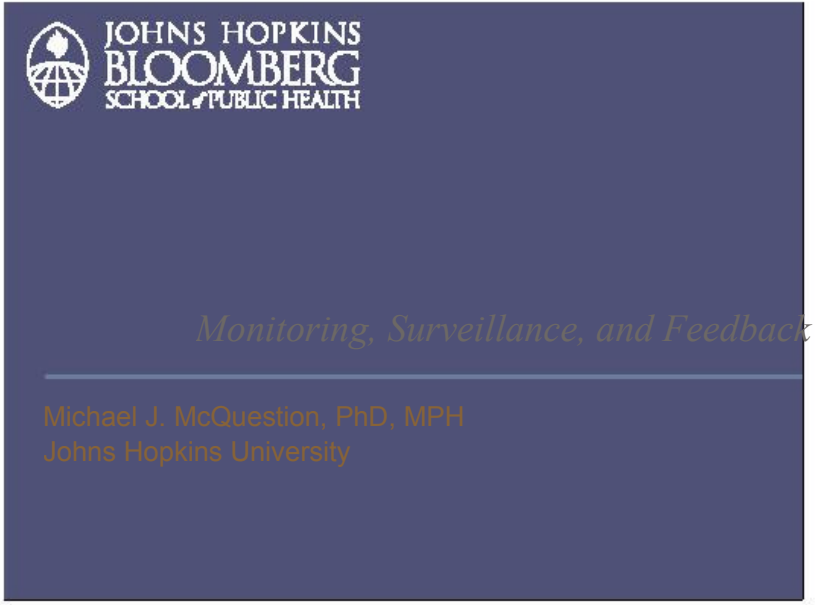
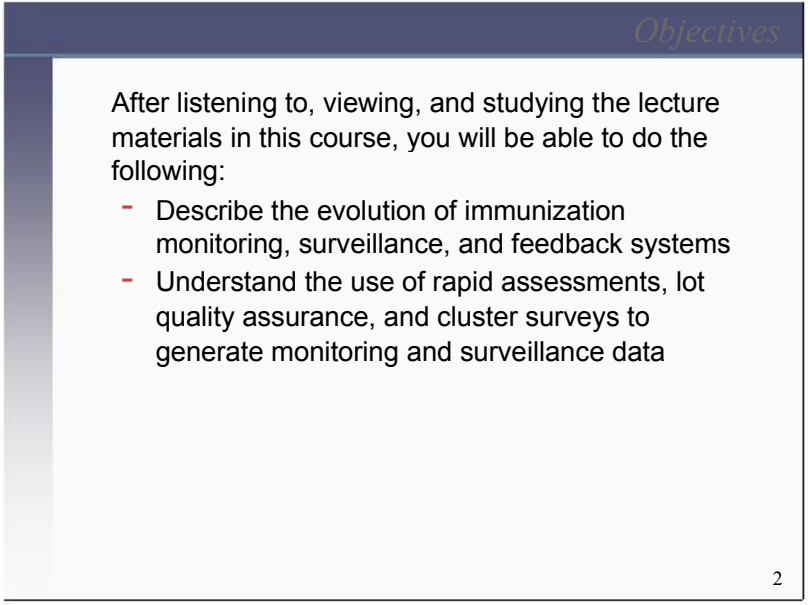
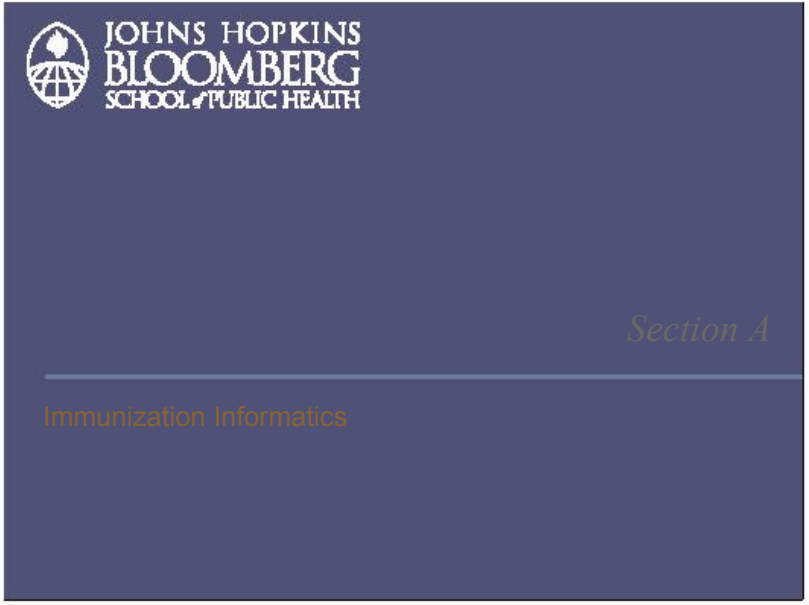
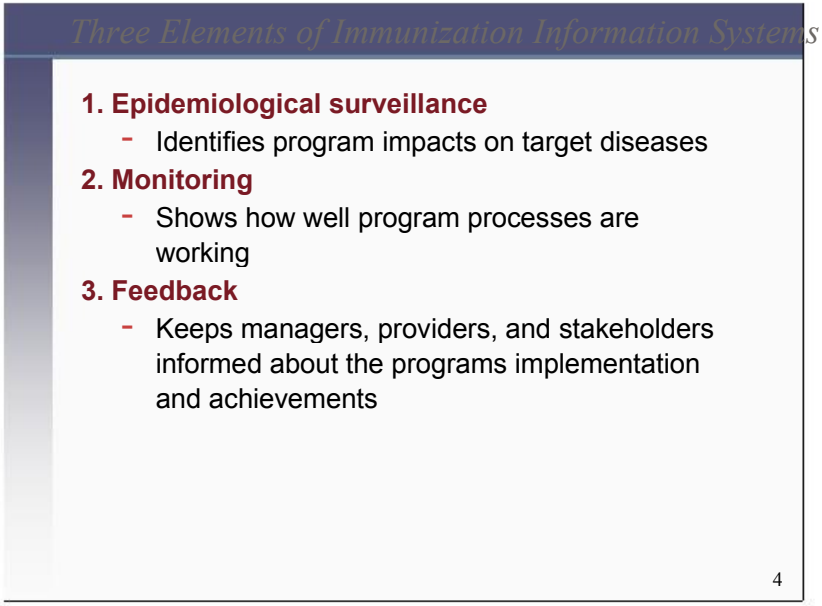






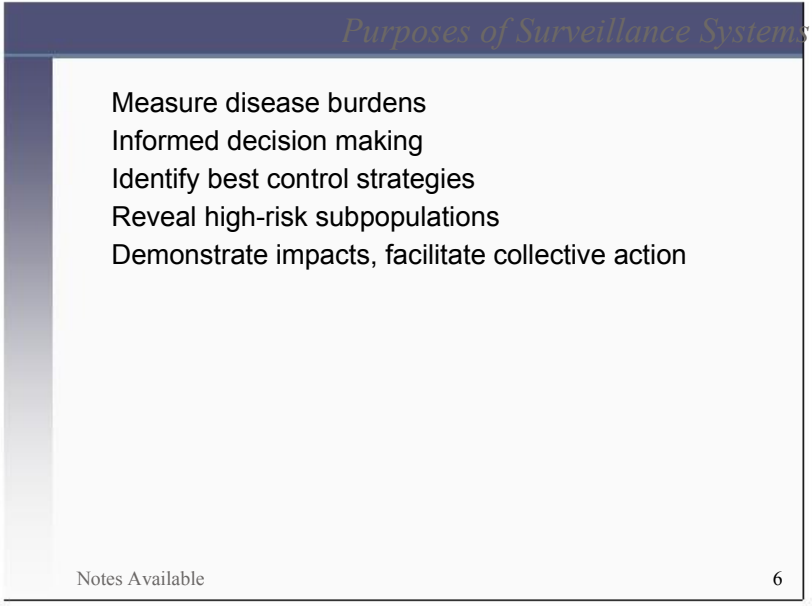






Source:

WHO,
2001


Purposes of Surveillance Systems
Measure disease burdens
Informed decision making
Identify best control strategies
Reveal high-risk subpopulations
Demonstrate impacts, facilitate collective action
Notes Available
6

Source:

WHO,
1993

Surveillance Methods

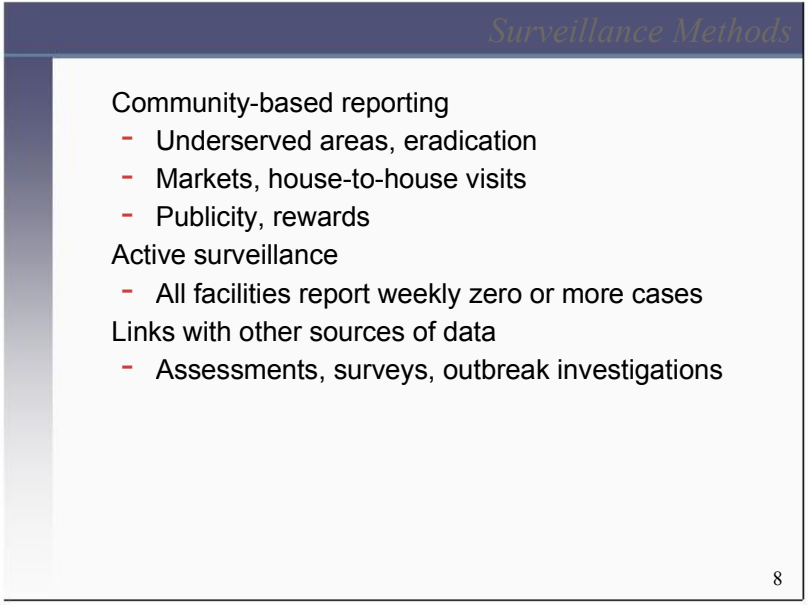
Routine reporting

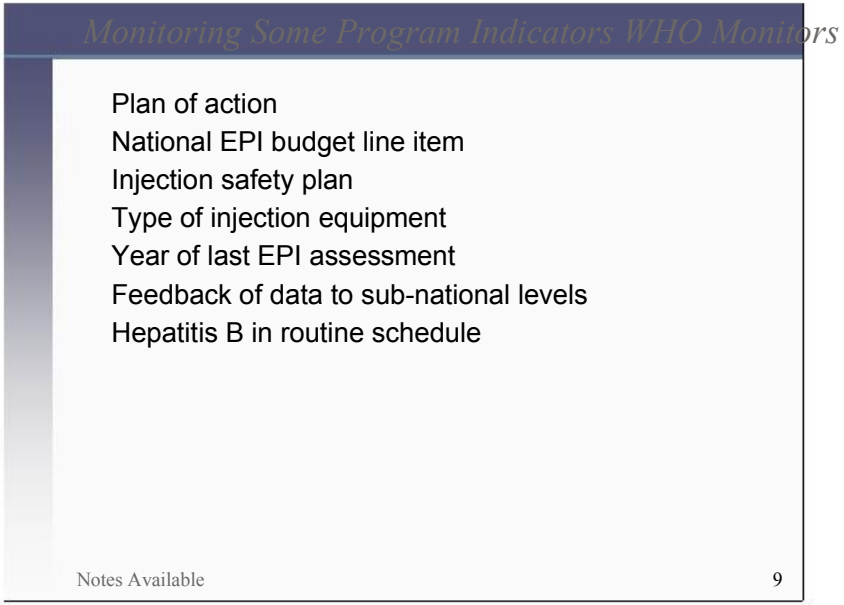
- Useful for monitoring trends
- Includes cases, adverse events
- Main weaknesses
  - Under-registration
  - Inaccurate population denominators

Sentinel sites

- Ideally to supplement routine surveillance
- Referral facilities, high-risk areas

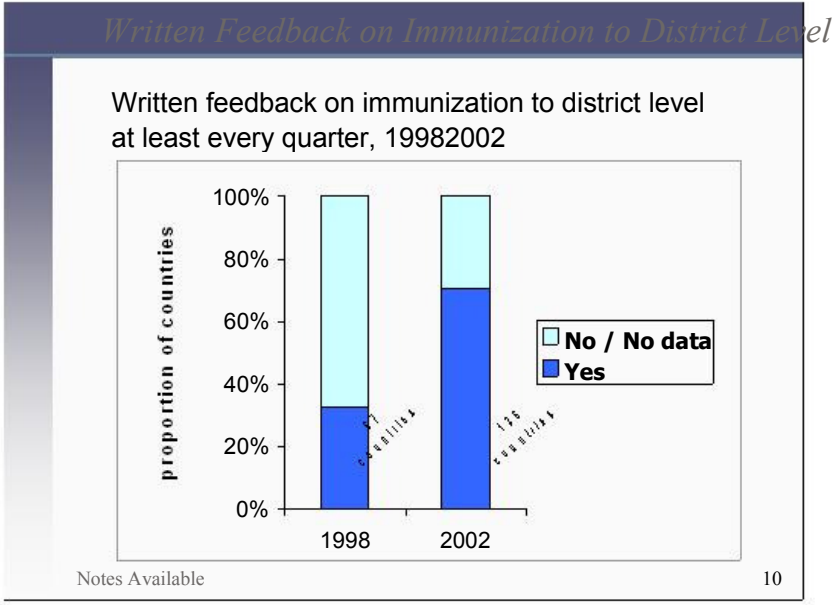
Continued 7


Surveillance Methods
Community-based reporting
- Underserved areas, eradication
- Markets, house-to-house visits
- Publicity, rewards
Active surveillance
- All facilities report weekly zero or more cases
Links with other sources of data
- Assessments, surveys, outbreak investigations
8



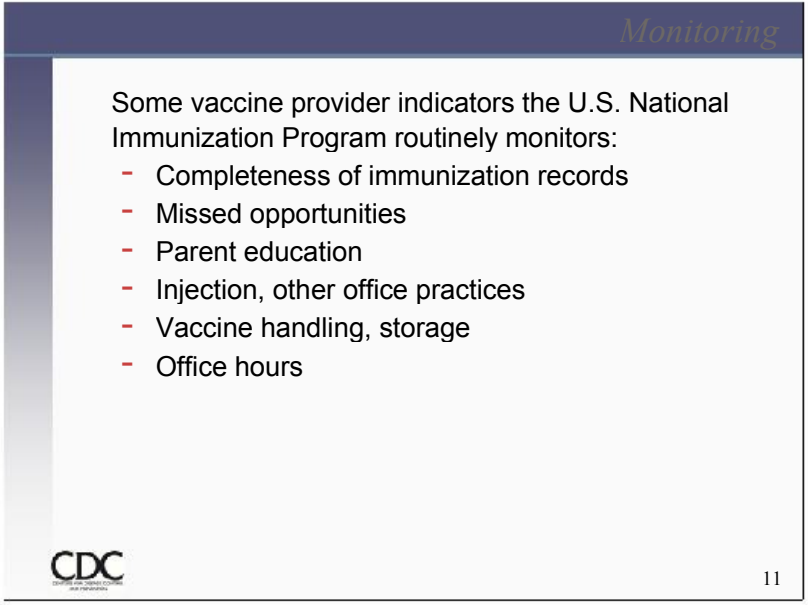
Source:

WHO
http://www.nt.who.int/vaccines/globalsummary/Immunization/CountryProfileResult.cfm)
2002



Source: WHO/UNICEF joint reporting form, 1998, 2002

data from 192 WHO member states



U.S. Vaccine-Preventable Disease Surveillance

By law, health care providers and laboratories must report cases of 60 currently notifiable diseases including poliomyelitis, measles, pertussis, tetanus, diphtheria, tuberculosis, hepatitis B, haemophilous influenzaeto local or state health departments

Local departments initiate control measures, report case(s) to the state level

State, territorial health departments receive, analyze, and report the data to the CDC using the National Electronic Telecommunications System for Surveillance (NETSS)

CDC tabulates, validates, and disseminates the data; it also provides technical support to state, territorial health departments

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U.S. Vaccine Coverage Monitoring

U.S. vaccine coverage is not reported but estimated by the rolling cross-sectional National Immunization Survey

An increasing number of states and metropolitan areas are consolidating data from providers into immunization registries

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U.S. Feedback

Vaccine-preventable disease incidence, vaccine coverage levels, and other programmatic indicators are fed back to the public

- Weekly: in the *Morbidity and Mortality Weekly Report* (MMWR)
- Annually: in the *MMWR Summary of Notifiable Diseases, United States*

Here are some recent examples:

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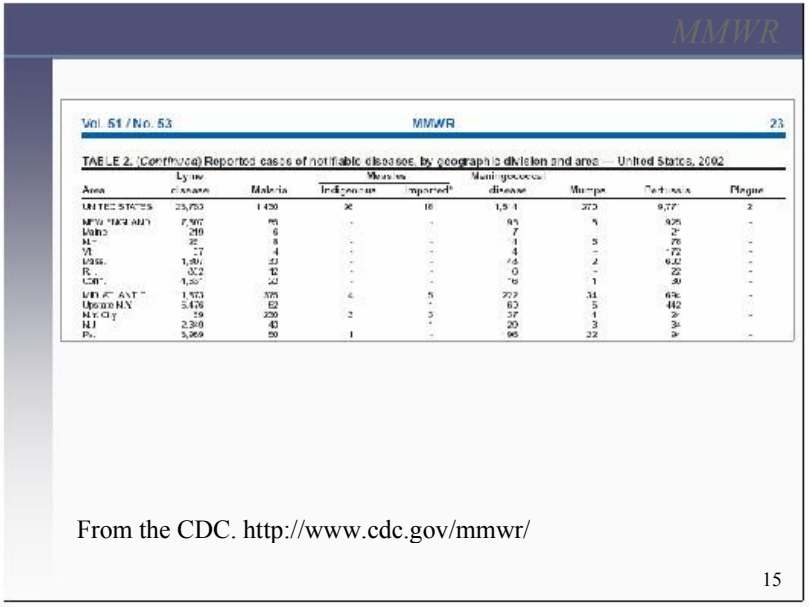

From the CDC. http://www.cdc.gov/mmwr/

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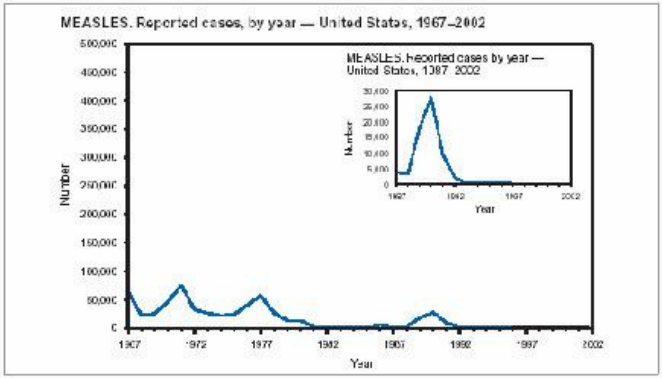
Measles

Reported cases (thousands) by year, United States, 19672002



Source: CDC

16

Source: CDC. Summary of

notifiable diseases. 1998.

Estimated Vaccination Coverage

TABLE 1. Estimated vaccination coverage among children aged 19–35 months, by selected vaccines and dosages — National Immunization Survey, United States, 1999–2003

Vaccine	1999* % (95% CI†)	2000† % (95% CI)	2001§ % (95% CI)	2002¶ % (95% CI)	2003** % (95% CI)
DTP/DT/DTaP††					
≥3 doses	85.9 (±0.4)	84.7 (±0.6)	84.3 (±0.6)	84.9 (±0.6)	86.0 (±0.6)
≥4 doses	83.8 (±0.5)	81.7 (±0.6)	82.7 (±0.6)	81.6 (±0.6)	84.0 (±0.6)
Polio virus ≥3 doses	89.6 (±0.6)	89.5 (±0.6)	89.4 (±0.7)	90.2 (±0.7)	91.6 (±0.7)
Hib§§ ≥3 doses	93.5 (±0.5)	93.4 (±0.5)	93.0 (±0.6)	93.7 (±0.6)	95.1 (±0.6)
MMR¶¶ ≥1 dose	91.6 (±0.6)	90.6 (±0.6)	91.4 (±0.6)	91.8 (±0.7)	93.0 (±0.6)
Hepatitis B ≥3 Doses	88.1 (±0.7)	90.3 (±0.6)	88.9 (±0.7)	89.9 (±0.7)	92.1 (±0.6)
Varicella ≥1 dose	87.5 (±1.0)	87.8 (±0.9)	86.3 (±0.8)	90.6 (±0.9)	94.5 (±0.7)
PCV***					
≥3 doses	—	—	—	40.9 (±1.1)	55.1 (±1.0)
≥4 doses	—	—	—	—	39.0 (±1.1)
Combined series					
4:3:1:3†††	79.9 (±0.8)	77.6 (±0.9)	78.6 (±0.9)	78.5 (±1.0)	82.2 (±0.9)
4:3:1:3:3§§§	78.4 (±0.9)	76.2 (±0.9)	77.2 (±0.9)	77.5 (±1.0)	81.3 (±0.9)
4:3:1:3:3:1¶¶¶	73.2 (±0.9)	72.9 (±0.9)	73.7 (±0.9)	74.8 (±1.0)	79.4 (±0.9)
4:3:1:3:3:1:1****	—	54.1 (±1.0)	61.3 (±1.0)	65.5 (±1.1)	72.2 (±1.0)

* Born during 1 July 1998–30 June 1999.
† Born during 1 January 1999–June 2000.
§ Born during January 1999–June 2001.
¶ Born during January 2000–June 2002.
** Born during January 2001–June 2002.
†† Confidence interval.
§§ Diphtheria and tetanus toxoids and pertussis vaccine, diphtheria and tetanus toxoids and diphtheria and tetanus toxoids and acellular pertussis vaccine.
¶¶ Haemophilus influenzae type b.
*** Measles, mumps, and rubella vaccine.
††† Pneumococcal conjugate vaccine.
§§§ Comprises ≥4 doses of DTP/DT/DTaP, ≥3 doses of polio virus vaccine, and ≥1 dose of measles-containing vaccine.
¶¶¶ 4:3:1:3 plus ≥3 doses of Hib vaccine.
**** 4:3:1:3:3 plus ≥1 dose of hepatitis B vaccine.
†††† 4:3:1:3:3:1 plus ≥1 dose of varicella vaccine.

Source: CDC

Developing World Feedback

- WHO is the definitive source of data on vaccine coverage and vaccine-preventable diseases in the developing world
- Ministries of health report most of the data
- These routine data are often supplemented by rapid assessments, surveys, and audits
- Results are fed back in several publications

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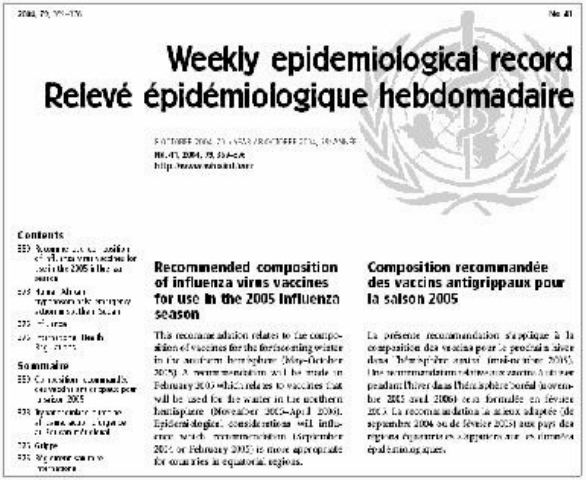
WHO Feedback: Weekly Epidemiological Record



Weekly epidemiological record
Relevé épidémiologique hebdomadaire

Contents

Sommaire

Recommended composition of influenza virus vaccines for use in the 2005 influenza season

Composition recommandée des vaccins antigrippaux pour la saison 2005

Source: The WHO. http://www.who.int/wer/2004/7942/en/

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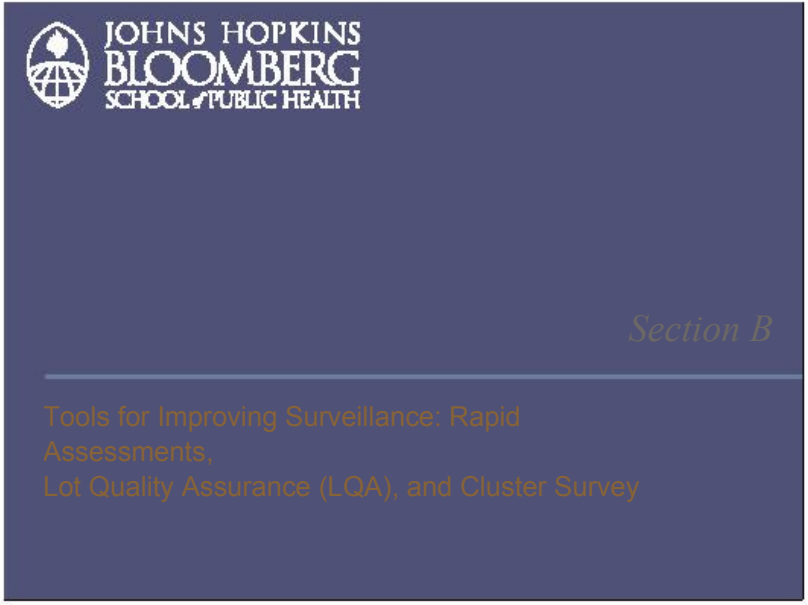
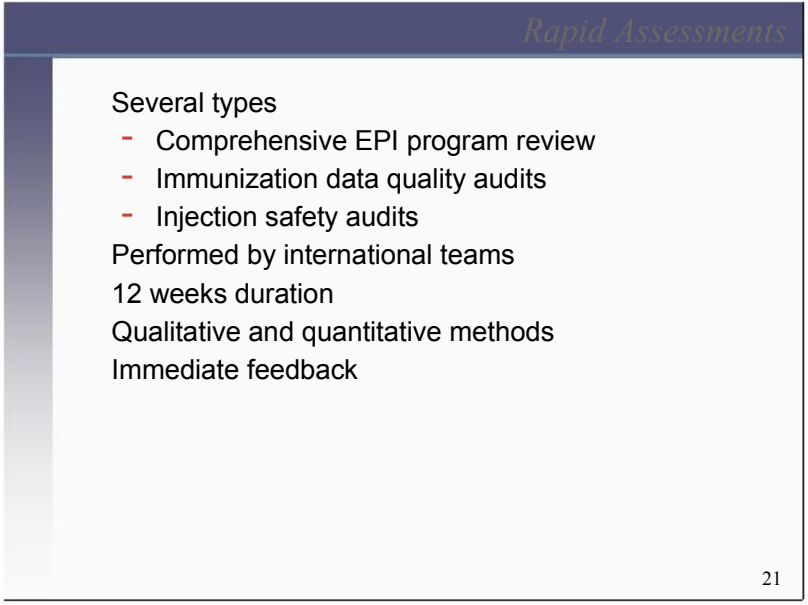
From the WHO,

http://www.who.int/wer/2004/7942/en/





Lot Quality Assurance

Purpose: to check quality of reported data

Lots can be health facilities, geographic areas, administrative records, etc.

Combines stratified random sampling and one-sided hypothesis testing

Lot results can be combined to estimate coverage

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LQA Method, Step by Step

Declare number of lots using census or other data as sampling frame

Fix acceptable upper threshold for performance (e.g., 80% fully immunized) and a lower threshold (say, 50%)

- Based on local information
- Any lots below the upper threshold are rejected

Define power (i.e., probability of a Type I error)

Fix acceptable level of random error (e.g., 5%)

Calculate total sample size: n units

Calculate number of units needed per lot

Set critical value (maximum no. defective units/lot) using standard tables

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Another Variant of the LQA Method

1st stage
- Sampling frame: list all potential lots
- Randomly select, say, 1030 clusters
- Sketch map, segment each cluster

2nd stage
- Randomly select one segment/cluster
- Interview all respondents in segment (usually 1040 households, depending on thresholds, power, critical value)

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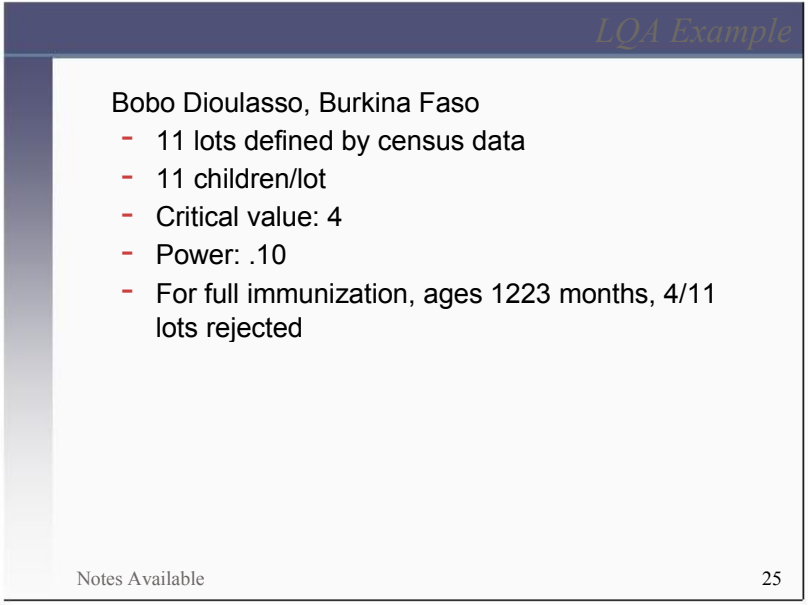


Source: WHO Weekly Epidemiological

Record, 1995,70,261268)

Standard WHO 30Cluster Survey

Purpose: to estimate population coverage level

n= 210 children ages 1223m, in 30 clusters (k)

- Assumes coverage = 50%, power=.10
- n, k can be expanded to measure other, less common variables

First sampling stage: randomly draw k clusters from a list of all possible clusters

Continued 26

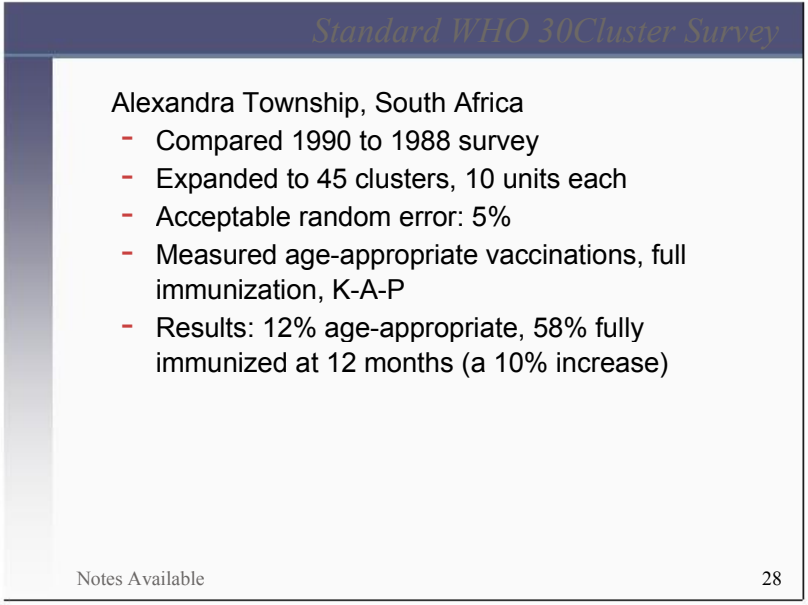
Standard WHO 30Cluster Survey

Second sampling stage (each cluster):

- Randomly choose a starting point household
- Randomly choose a cardinal direction from the starting point (spin a bottle)
- Systematically sample the next six eligible households in that direction

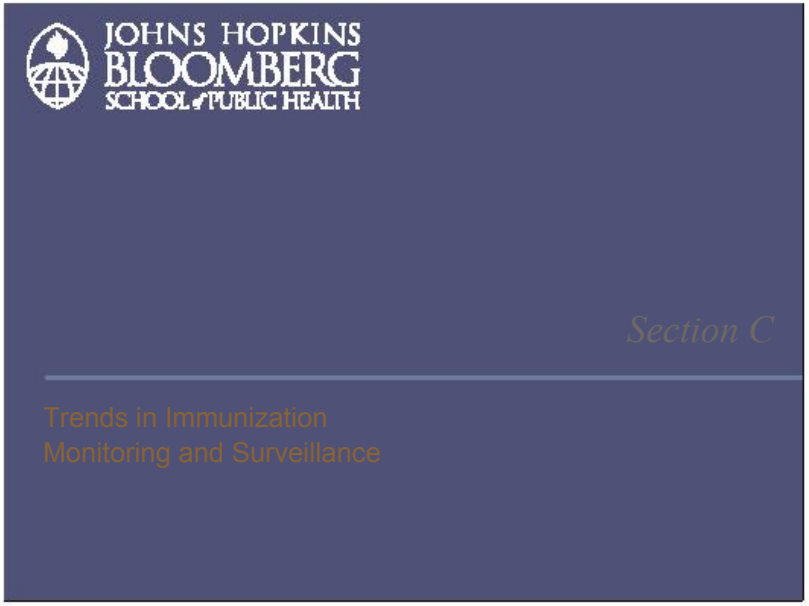
Interview using standard questionnaire

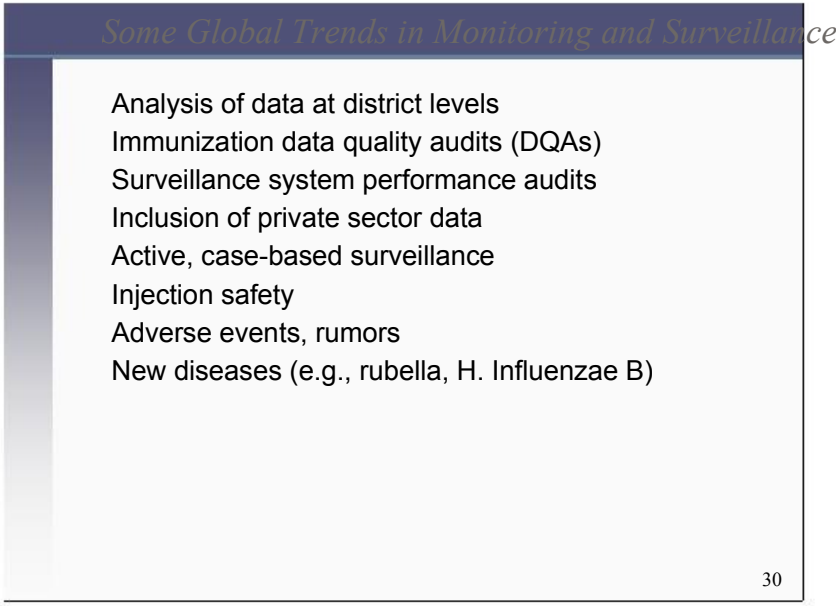
Continued 27



Source: Coetzee,

Ferrinho and Reinach
1993)





Rich, Decentralized Information Flows

As data management capabilities improve and countries increasingly set disease-reduction targets, the distinction between monitoring and surveillance is blurring

Example: current WHO/UNICEF core recommendations for EPI surveillance (WHO 2004)

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WHO/UNICEF Core Surveillance Indicators

Written feedback on EPI performance, surveillance to peripheral levels at least quarterly

- At least DPT3 by district
- At least measles, neonatal tetanus, acute flaccid paralysis cases

Annual retrospective hospital record reviews

- Neonatal tetanus
- Measles
- Polio/AFP

Continued 32

WHO/UNICEF Core Surveillance Indicators

Zero reporting surveillance ongoing for:

- Neonatal tetanus
- Measles
- Polio/AFP

Active surveillance ongoing for:

- Neonatal tetanus
- Measles
- Polio/AFP

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Online Informatics

Technological advances are leading to online data management systems

Example: WHO vaccine-preventable diseases monitoring system

- http://www.who.int/vaccines-surveillance/StatsAndGraphs.htm

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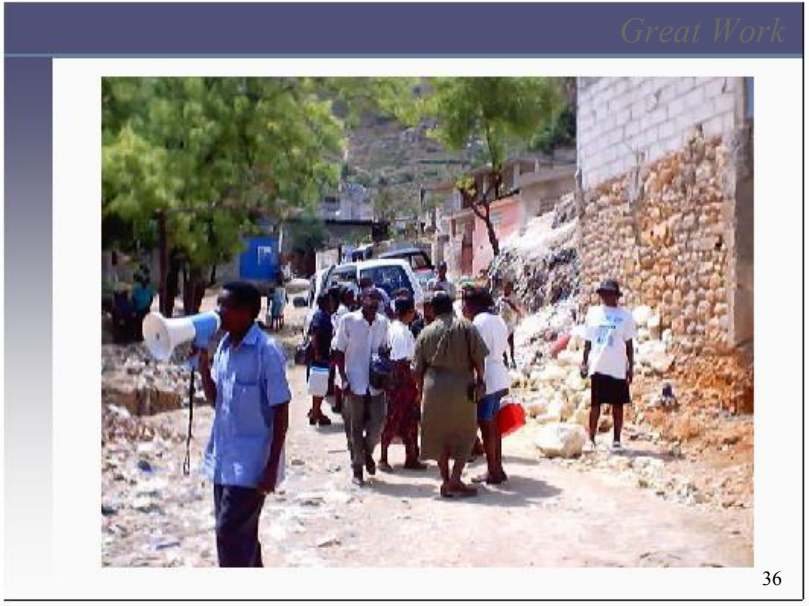
Selected WHO/UNICEF Core EPI Performance Indicators

	AFRO		AMRO		EMRO		EURO		SEARO		W PRO	
	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002
st ates	46	46	35	35	22	22	51	51	10	11	27	27
st ates reporting	46	45	35	33	20	20	43	47	10	11	26	26
all districts with >80% DPT3	3	2	8	7	9	8	21	22	1	2	7	7
2+ interagency meet s	30	32	15	14	6	8	23	18	9	6	13	11
adverse events monitored	19	17	17	15	13	11	32	42	6	9	15	14
Hepatitis B vaccine in use	5	7	29	30	8	10	28	29	0	0	7	8

35



In the United States, NETSS, HIV/AIDS, Vaccine Adverse Events, and other national surveillance systems are being integrated into the National Electronic Disease Surveillance System (NEDSS)

NEDSS will:

- Standardize case definitions, reporting forms
- Allow states to transmit real-time data via the Internet

Currently, WHO member countries are striving to meet three main disease reduction targets

1. Reduce measles by 90%
2. Eliminate neonatal tetanus
3. Eradicate poliomyelitis

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Newest Surveillance Quality Indicators

To accomplish these targets, WHO has redefined essential epidemiological capabilities to include:

- **Timeliness/completeness** of reporting
- Proportion of reported cases/outbreaks that are **investigated**
- Proportion of investigated cases/outbreaks that are followed with a **response**

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Example: Polio Surveillance

Routine active surveillance identifies high-risk geographic areas

Sentinel surveillance, case-finding increase system sensitivity

All suspected polio cases are investigated and followed up

Monitoring and feedback keep all actors informed

Continued 39

Example: Polio Surveillance

WHO supports polio surveillance by:

- Standardizing definitions, procedures
- Monitoring and disseminating national surveillance performance measures
- Controlling quality of reference laboratories
- Providing training, technical assistance to countries as needed

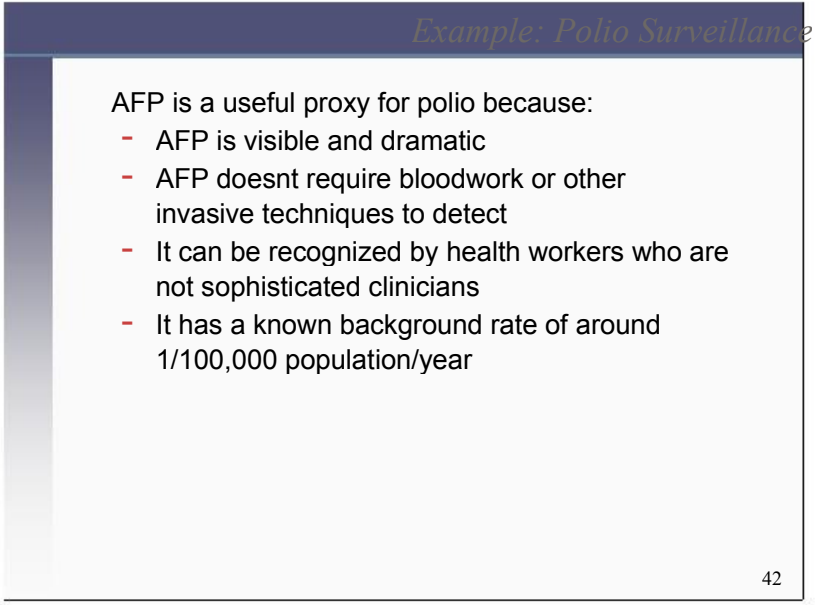
Continued 40

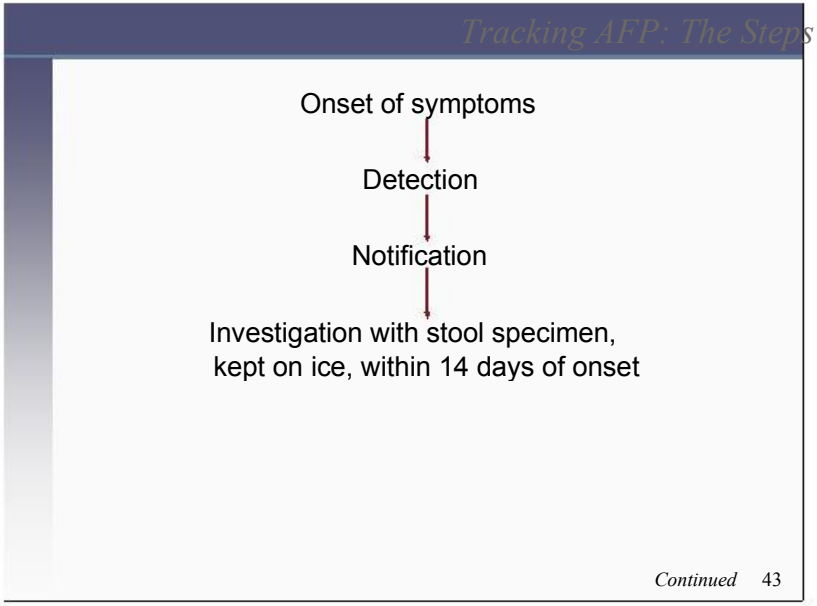
Example: Polio Surveillance

Standard WHO-recommended definition of a **suspected case** (that should be notified)

- Any child under fifteen years of age with acute, flaccid paralysis (AFP) or any person with paralytic illness at any age when polio is suspected

Continued 41


Example: Polio Surveillance
AFP is a useful proxy for polio because:
- AFP is visible and dramatic
- AFP doesnt require bloodwork or other invasive techniques to detect
- It can be recognized by health workers who are not sophisticated clinicians
- It has a known background rate of around 1/100,000 population/year
42



Tracking AFP: The Steps

Specimen arrival at lab, within 3 days

↓

Virus isolation results reported, within 28 days

↓

Viral isolates sent to regional lab, serological results within 28 days

↓

While the lab is working, a follow-up clinical exam is done, within 60 days

↓

Both sides of the process should be completed within ~60 days

↓

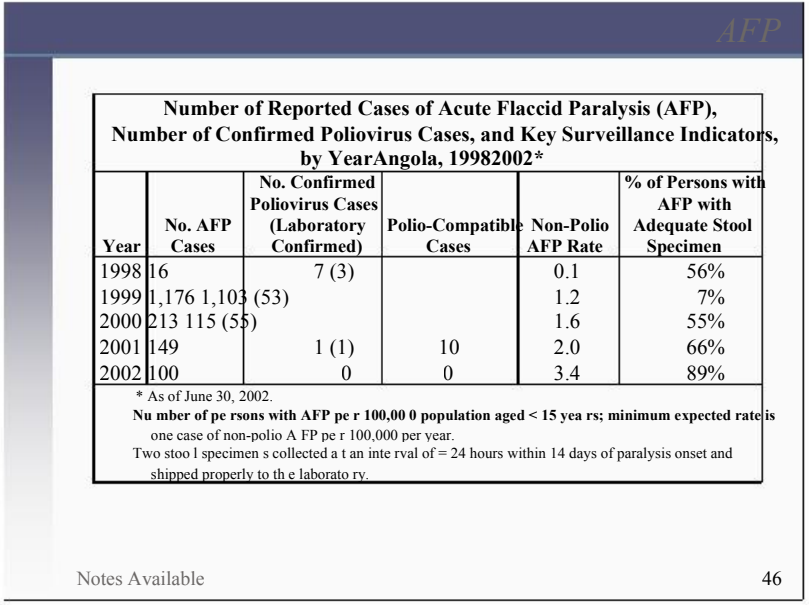
Final classification of the case (1=confirmed; 2=compatible; 3=discarded), is required within 90 days of its onset

Continued 44

Summary of Polio Surveillance Performance Indicators

- % of all expected monthly reports that were received (> 90%)
- Annualized non-polio AFP rate per 100,000 children under 15 years of age (> 1/100,000)
- % of AFP cases investigated within 48 hours (> 80%)
- % of AFP cases with two adequate stool specimens collected 2448 hours apart and < 14 days of onset
(> 80%)

45



Source: WHO (Reprinted in MMWR, Vol 51, No

34;762 08/30/2002)

AFP and polio reporting, year-to-date (Data r eceived at WH O Geneva as of 20 February 2002)

Region	2000 (As of 17 February 2001) Non-Polio AFP Rate	Adequate Stool Specim ens	Polio Confirmed Cases	Wild Polio Virus Ca ses	2001 (As of 20 February 2002) Non-Polio AFP Rate	Adequate Stool Specimens	Polio Confirmed Ca ses	Wild Polio Virus Cases
African	1.30	53%	1,537	137	3.01	71%	110	62
The Americas	1.08	65%	12	0	1.25	89%	*	10 0
Eastern Mediterranean	1.42	67%	441	248	1.89	83%	139	139
European	1.14	83%		0	0 1.23	81%	**	3 ** 2
South-East Asia	1.73	81%	593	271	1.75	83%	267	267
Western Pacific	1.53	87%		0	0 1.39	88%	*	3 0
Global Total	1.55	75%	2,583	656	1.59	81%	535	470

* Vaccine-d eri ved p oliovirus
** Importations

47

Example: Analyzing District-Level Data in Malawi

By 2001, Malawi was able to routinely generate EPI performance indicators from each of its 26 health districts

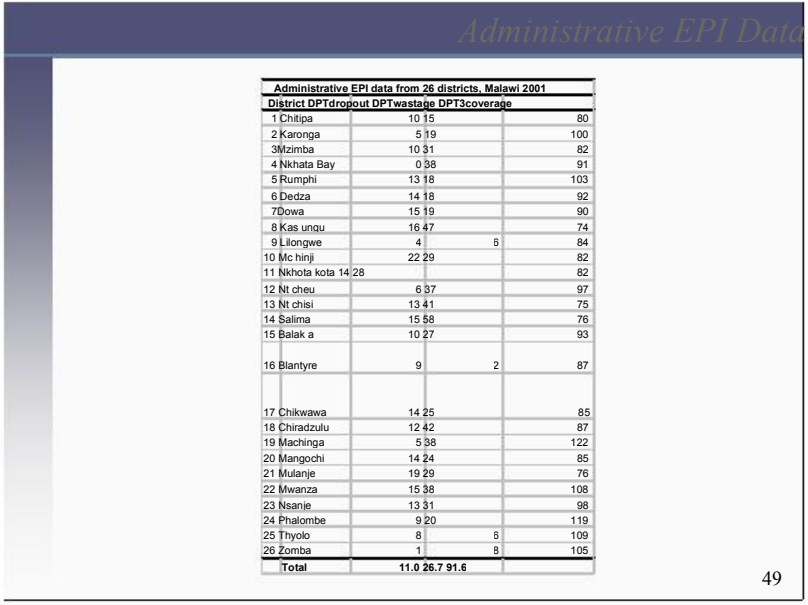
Here we analyze just three indicators

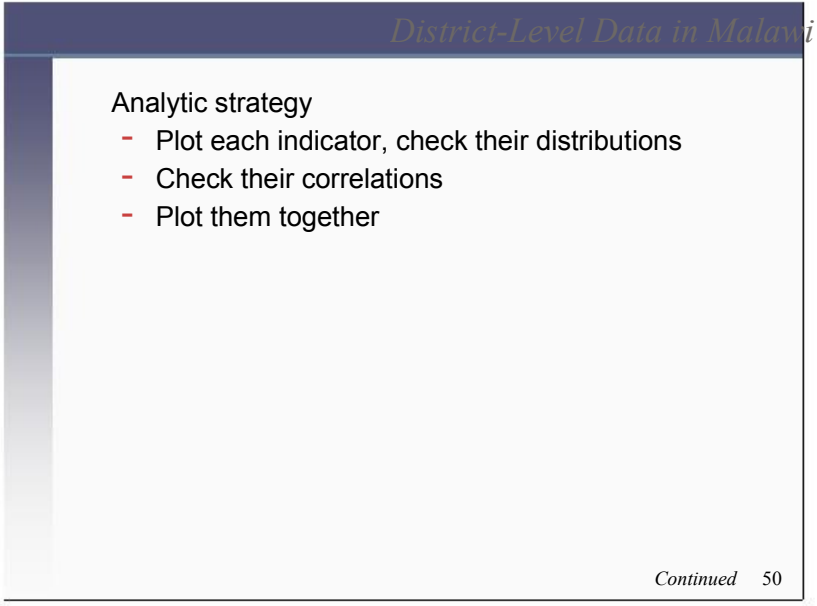
- DPT3 coverage rates
- DPT dropout rates
- DPT wastage rates

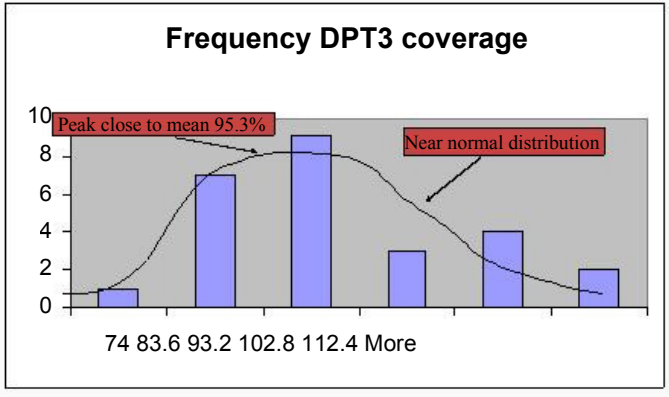
Here are two problems we can analyze

- How coverage, dropout and wastage co-vary
- Which districts are outliers

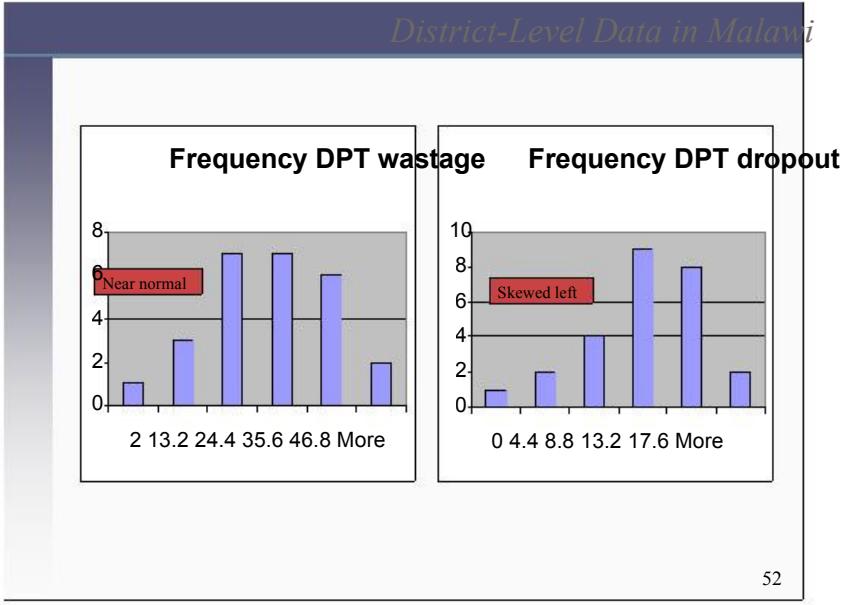
48






Frequency DPT3 coverage
10
8
6
4
2
0
Peak close to mean 95.3%
Near normal distribution
74 83.6 93.2 102.8 112.4 More

Continued



Check Correlations

Correlations

	Dropout	*Wastage*	*Coverage*
Dropo ut	1	0.31 **	0.46
Wastage		1	0.26 **
Coverage			1

** t-test significant at p<0.001

As expected, the higher the coverage level, the lower the dropout and wastage rates

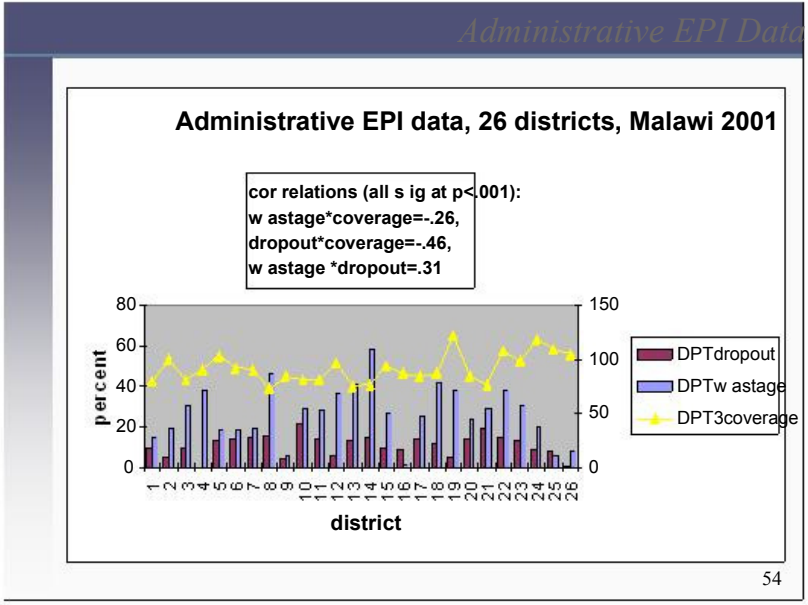
Also, the higher the dropout rate, the higher the wastage rate

A t-test shows these relationships are significant

We conclude the data are valid

How do the indicators look together.

53



District-Level Data in Malawi

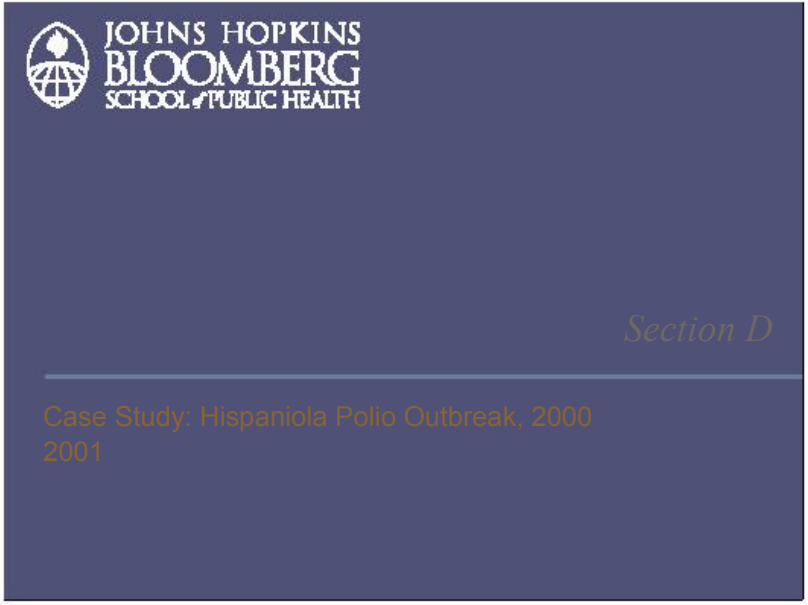
Positive outliers

- Districts 19, 24
  - High DPT3 coverage, very low dropout rates
- District 24 has it all
  - High coverage, low wastage, low dropout

Negative outliers

- Districts 8, 13, 14 have very high wastage rates

55



Hispaniola Outbreak

Routine AFP surveillance system reports a suspected polio case in October, 2000, in Monseor Nouel Province, Dominican Republic

- Onset of symptoms: July 18, 2000
- Age: 9 months
- Vaccinations: none

By mid-December, four additional confirmed cases are linked to index case

Continued 57

Hispaniola Outbreak

Another AFP case is reported from Anse a lOmbre, near Port-de-Paix, Haiti

- Onset of symptoms: August 30, 2000
- Age: 2 years
- Vaccinations: none

By mid-December, house-to-house search finds 13 more suspected cases in Haiti

58

Hispaniola Outbreak

These are the first polio cases in the Americas region since 1991

Laboratory results

- Same Sabin Type I vaccine-associated virus isolated from Dominican, Haitian stool samples

Recommended actions

- Immediate mass vaccination to interrupt transmission; continued aggressive case-finding

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Immunization Day Near Thiotte, Haiti, March 2001

60

By Mid-March 2001

By mid-March, 2001, there are 17 confirmed polio cases: 14 in Dominican Republic, 3 in Haiti

- 14 isolates from cases, 3 from contacts
- Only one was completely vaccinated
- Median age: 3 years
- Most in low-OPV coverage districts

61

By Mid-March 2001

Indicator	Dominican Republic	Haiti
Stool samples collected: AFP cases	84	17
Stool samples collected: contacts	205	34
Polio cases confirmed	14	3

62

By Mid-March 2001

In the Dominican Republic, two national immunization days (NIDs) plus house-to-house vaccinations stop the outbreak

In Haiti, transmission continues, despite two NIDs

- LQAs show coverage < 40% (next slide)
- Here is an excerpt of one LQA series in Region Sud-Est, following the 2nd NID

63

OPV vaccinations, children 6-23m, before and after mass campaign, Jacmel Region, Haiti, March 2001

lot	1	2	3	4	5	6	7	8	9
before									
yes	27	29	17	22	14	14	7	24	26
no	11	6	4	3	5	12	9	24	12
total	38	35	21	25	19	26	16	24	38
reject	yes	no	no	no	yes	yes	yes	no	yes
after									
yes	35	34	19	23	16	16	8	24	33
no	3	1	2	2	3	10	8	24	5
total	38	35	21	25	19	26	16	24	38
reject	no	no	no	no	yes	yes	yes	no	no

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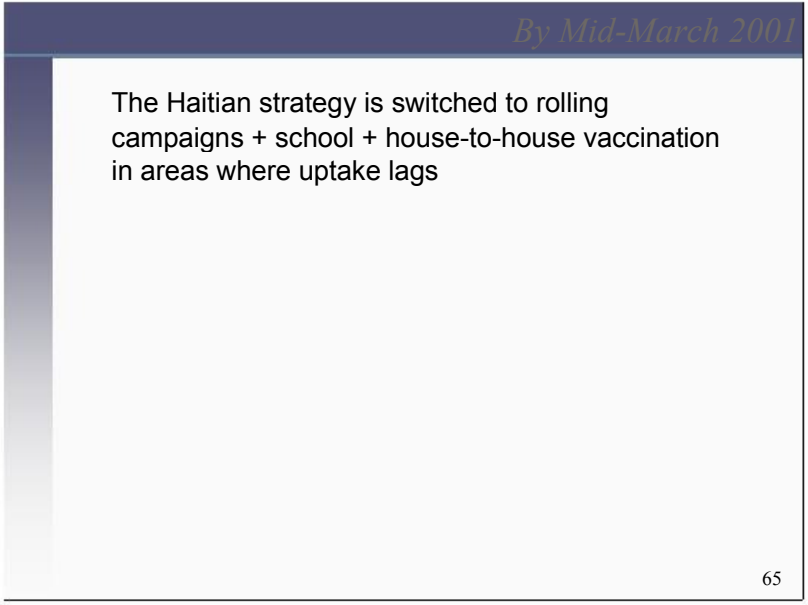


By Mid-June 2001

Indicator	Dominican Republic	Haiti
AFP cases	95	29
AFP stool samples collected	94	27
Polio cases confirmed	14	6

66

By August 2001

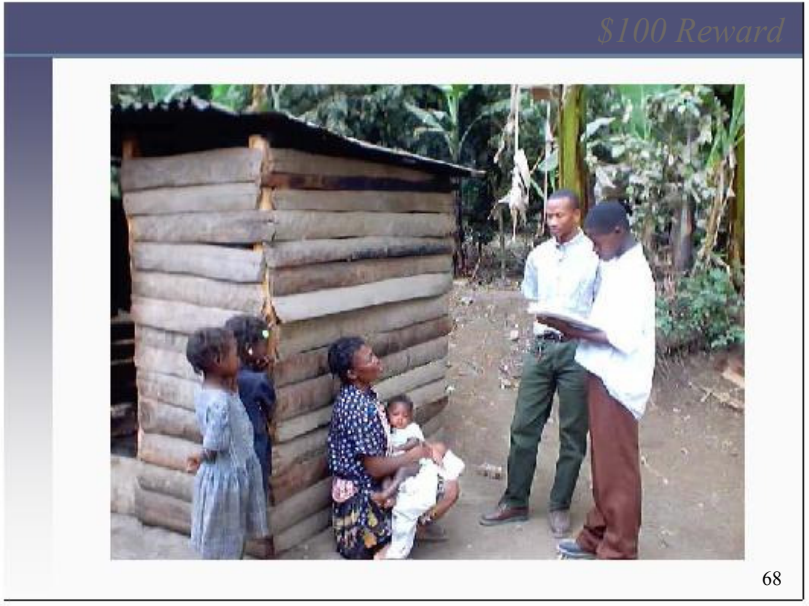
During MayJuly, 2.1 million children under 10 are vaccinated throughout Haiti

- Systematic LQAs show ~90% coverage for OPV1

Surveillance continues to improve following health worker case search retraining

- WHO/PAHO announces a US$100 reward for anyone identifying a new polio case

67


$100 Reward
68

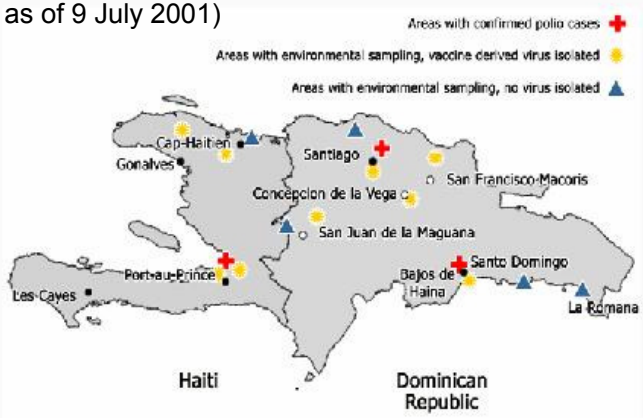
By August 2001

Last confirmed polio case has onset on 12 July, 2001

Sabin-1 derived polioviruses are found in sewage samples near recent cases in Dominican Republic and Haitimore evidence the outbreak was entirely vaccine-derived

69

Isolation of vaccine-derived poliovirus in AFP cases and environmental sampling (data of cases as of 9 July 2001)



70

Epidemic Ends

National immunization campaign ends in November, 2001

Routine surveillance system reinstituted, sentinel sites added, active case search continues in 100 facilities

Cost of containing the outbreak: $4.82m (U.S.$)

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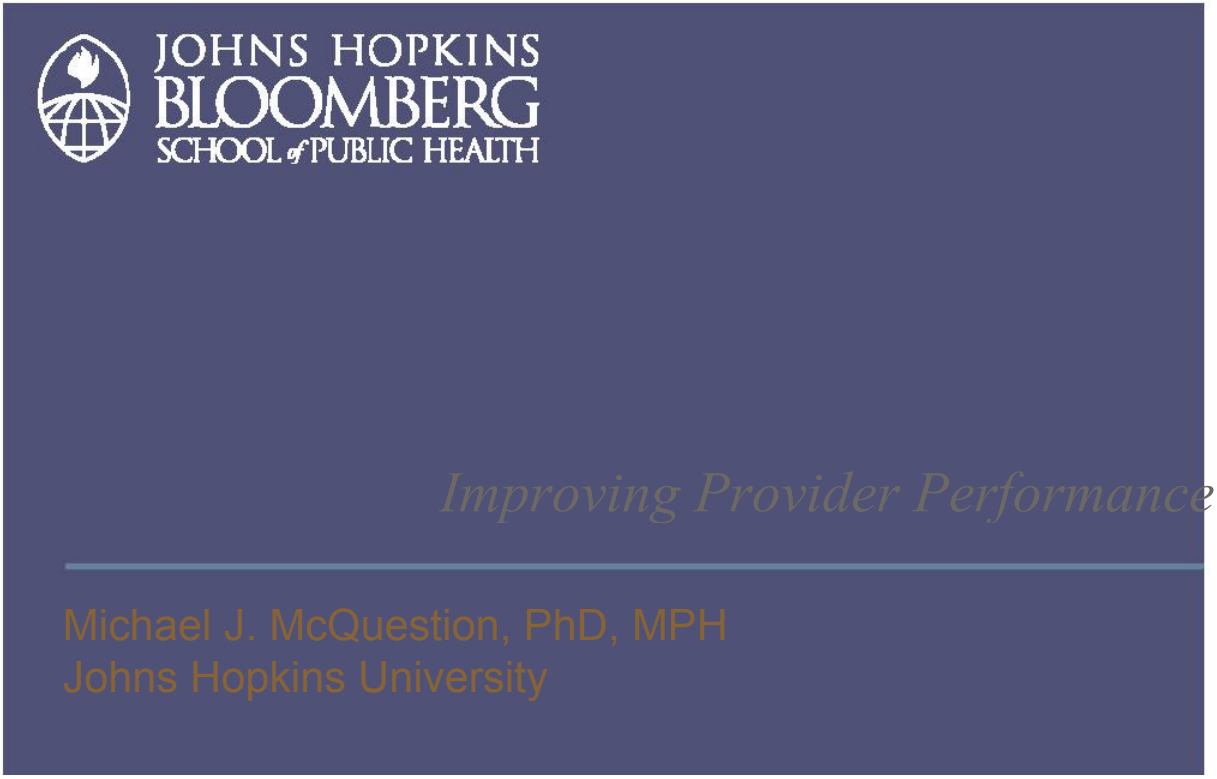
Summary

Surveillance, monitoring, and feedback are essential elements of any immunization program

Together, they:

- Document program achievements and problems
- Reveal and disseminate epidemiological data and trends
- Allow managers to focus resources where they are most needed
- Keep actors informed and motivated

72

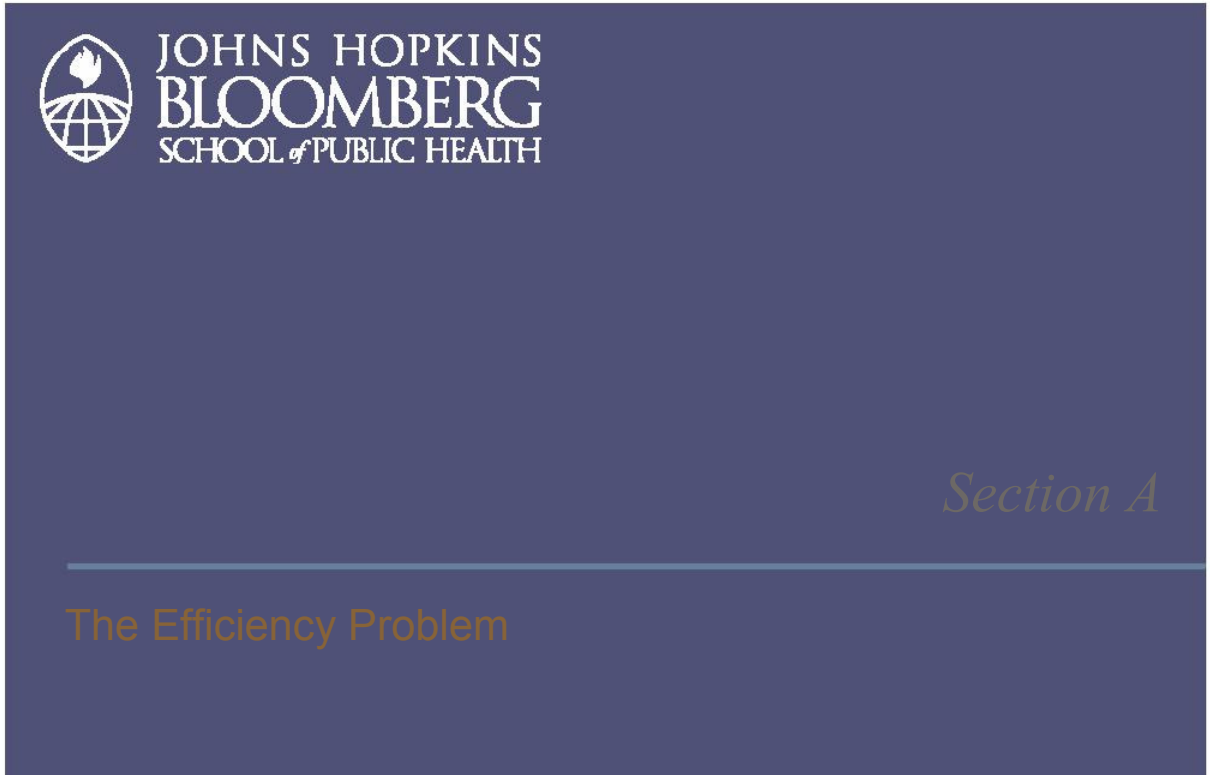


Objectives

After listening to, viewing, and studying the lecture materials in this course, you will be able to do the following:

- Understand the problems of inappropriate timing and missed opportunities for vaccination
- Utilize the CASA Program to analyze immunization provider efficiency

2



Problem Definition

Some children utilize health services but remain unimmunized

Some possible reasons

- Low vaccine efficacy
- Vaccines, supplies out of stock
- Parental rejection
- Provider inefficiencies

4

Framing the Efficiency Problem

System level

- Vaccine failures are almost always due to poor cold chain management
- Stock outages reflect weak logistical systems
- Vaccination norms and procedures may be out of date
- Supervision may be inadequate

Continued 5

Framing the Efficiency Problem

Local level

- Health workers do not know best immunization practices
- Health workers do not follow program norms and procedures
- Health workers do not correctly utilize available information
- Health workers do not educate parents
- Health workers are unmotivated

Continued 6

Framing the Efficiency Problem

System-level program inefficiencies require system-level solutions

Most local-level problems can be framed in terms of health worker performance

- Easier to solve
- Requires supervision and feedback
- May require retraining, reallocation of program tasks

7

Provider Inefficiencies

Missed opportunity: a health care encounter in which a person is eligible to receive a vaccination but is not vaccinated completely

Inappropriately timed vaccination: a child receives one or more vaccinations before or after the recommended age

Note: provider inefficiencies are distinct from *immunization dropout,* a health behavioral problem we will consider in a later lecture

8

Magnitude of the Problem

A review of 70 observational surveys in 44 industrialized and developing countries found a median 32% of eligible women and children had experienced missed immunization opportunities (Hutchins, Jansen and Robertson 1993)

- Industrialized: 15%
- Developing: 41%

Continued 9

Magnitude of the Problem

United States

- Population-based sample of 1,163 children in Oregon and Washington
  - 60% up to date at age 24 months (Bobo et al 1993)
- Mail and telephone survey of 1,500 employees of Johnson & Johnson
  - 65% of children born 19841991 up to date at age 24 months (Fielding et al 1994)

10

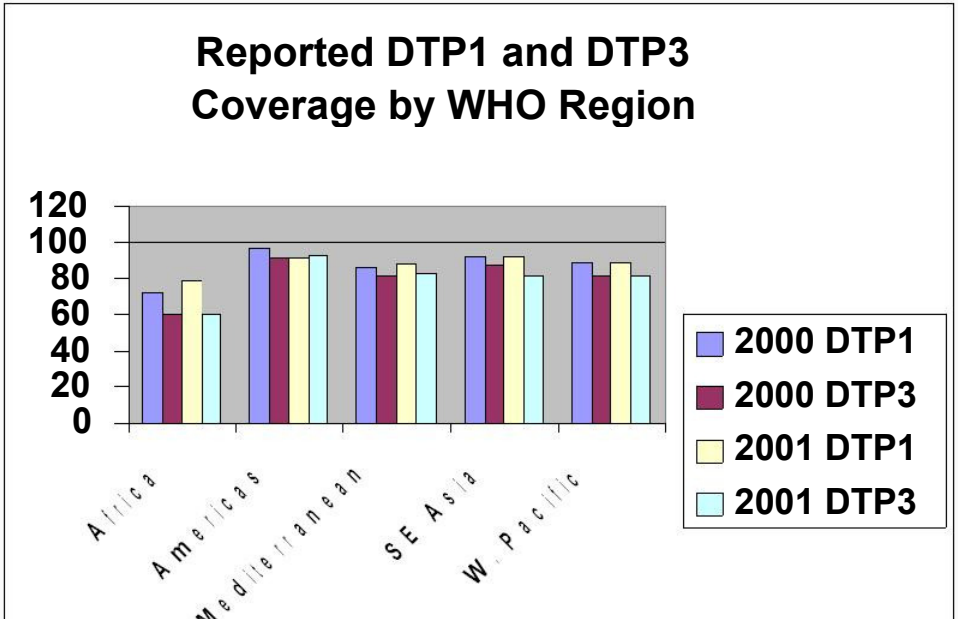
Measuring the Problem

The most common indicator of missed opportunities in the difference between DTP1 and DTP3, or TT1 and TT2 vaccination rates

The following slides show why these indicators are most meaningful at the local level

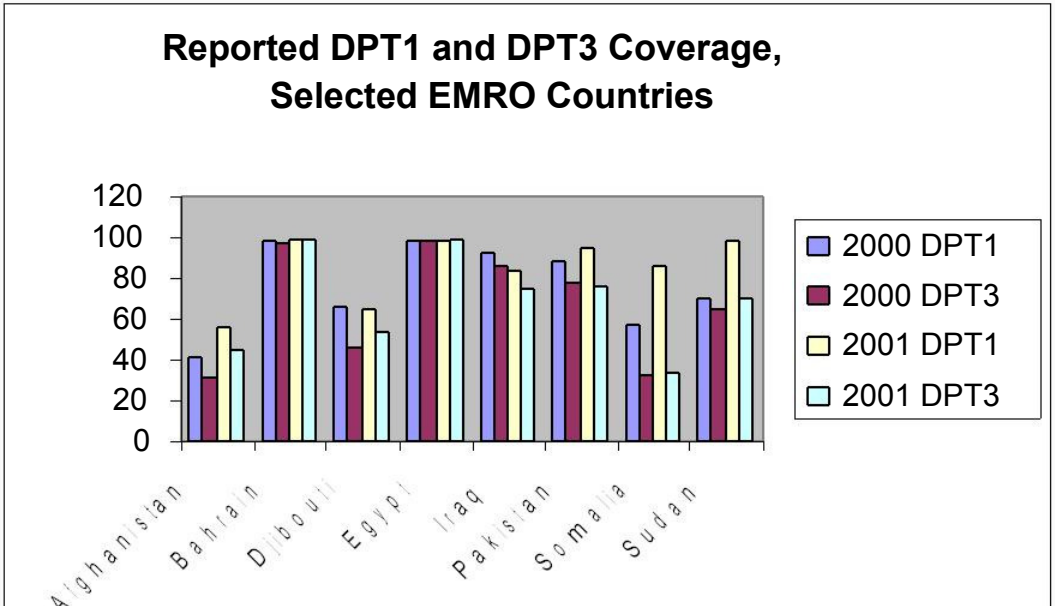
11

Little Regional Variation



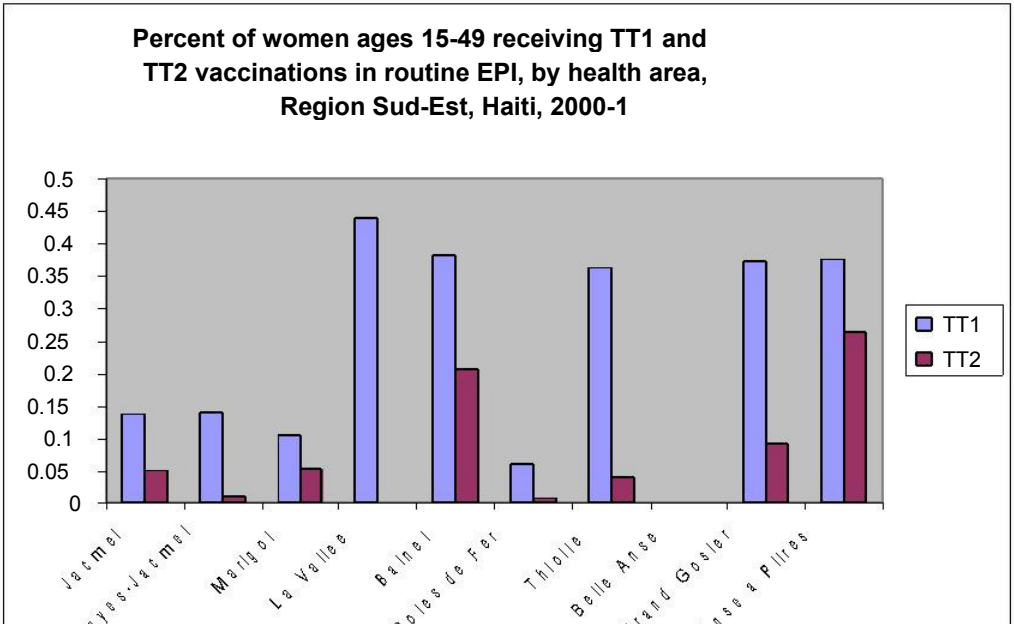

12

More Variation at National Level



13

And Even More at the Local Level



14

Causes of Missed Opportunities

Cause	Percent of all Missed Opportunities
Failure to administer vaccines simultaneously	22
False contraindications	19
Negative health worker attitudes	16
Logistical problems	10
Parental refusal	3

Notes Available 15

Missed Opportunities in the U.S.

Reason	Impact	Fixability
Provider unaware patient is eligible	+++	+++
Provider policy not to vaccinate	+++	+++
Failure to provide simultaneous vaccinations	+	++
Inappropriate contraindications	++	+
Administrative barriers, cost	+	+++

Notes Available 16

An Empirical Example

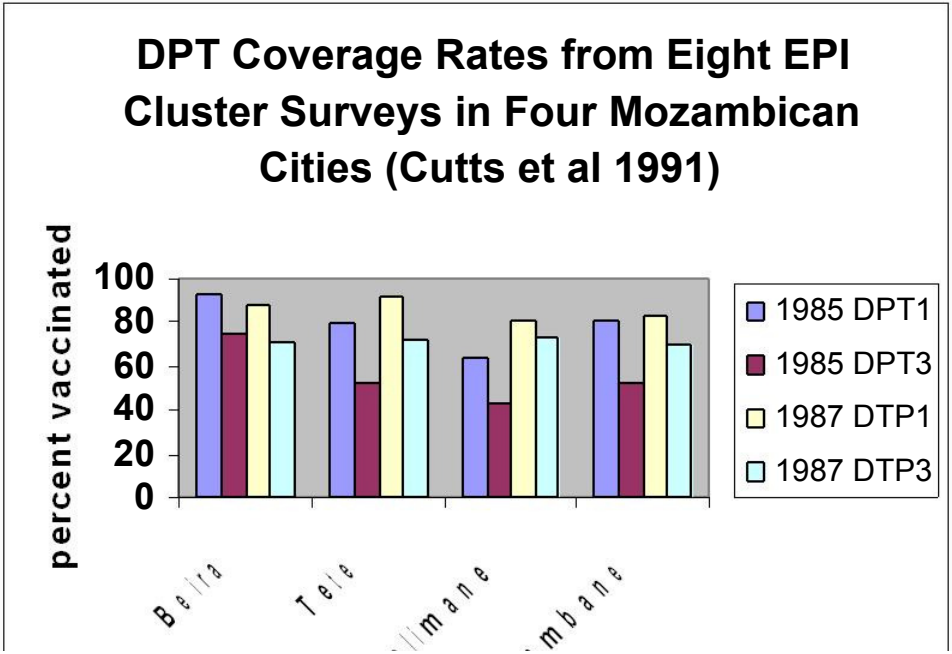
Cutts et al (1991) studied immunization program efficiency in Guinea Conakry and four cities in Mozambique

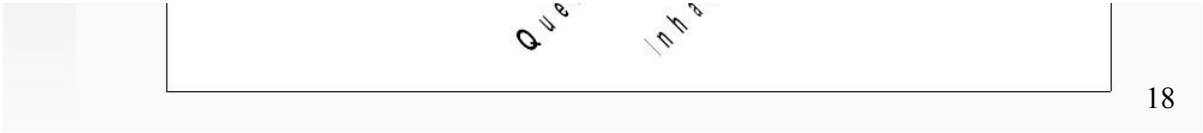
Methods: WHO EPI 30-cluster household surveys, clinic visits

Results: among children with cards, inefficiencies reduced coverage by 29% in Conakry and 19% in Mozambique

17

DPT Rates





18

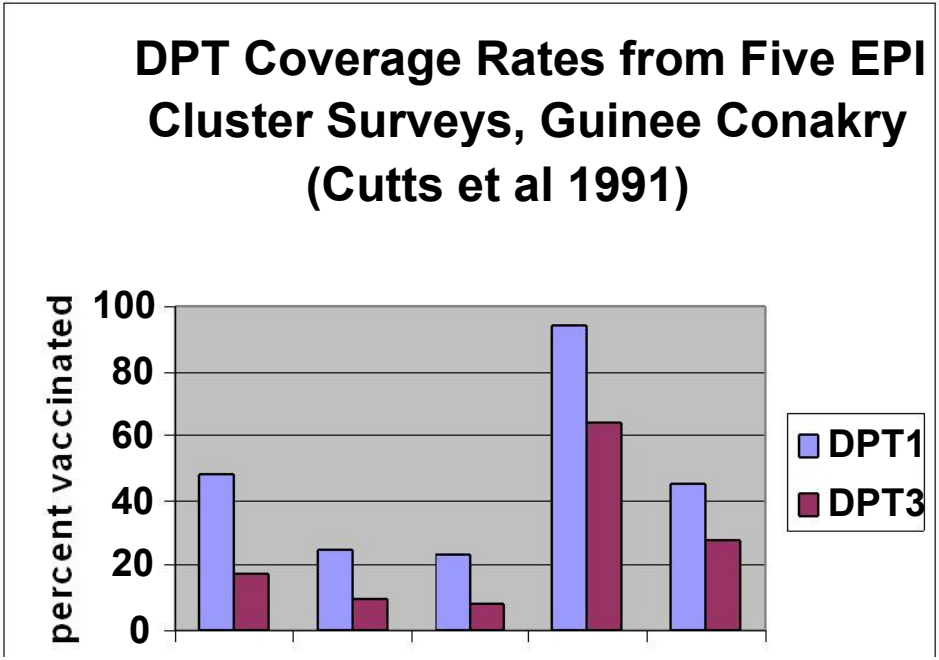
Missed Opportunities

Cumulative inefficiency effects, children 12-23m with cards, Mozambique 1987

	average 7 surveys	range
fully, correctly vaccinated	62	51-74
added coverage with:		
correct timing	11	6-15
simultaneous vaccination	2	1-4
vaccinate at	6	3

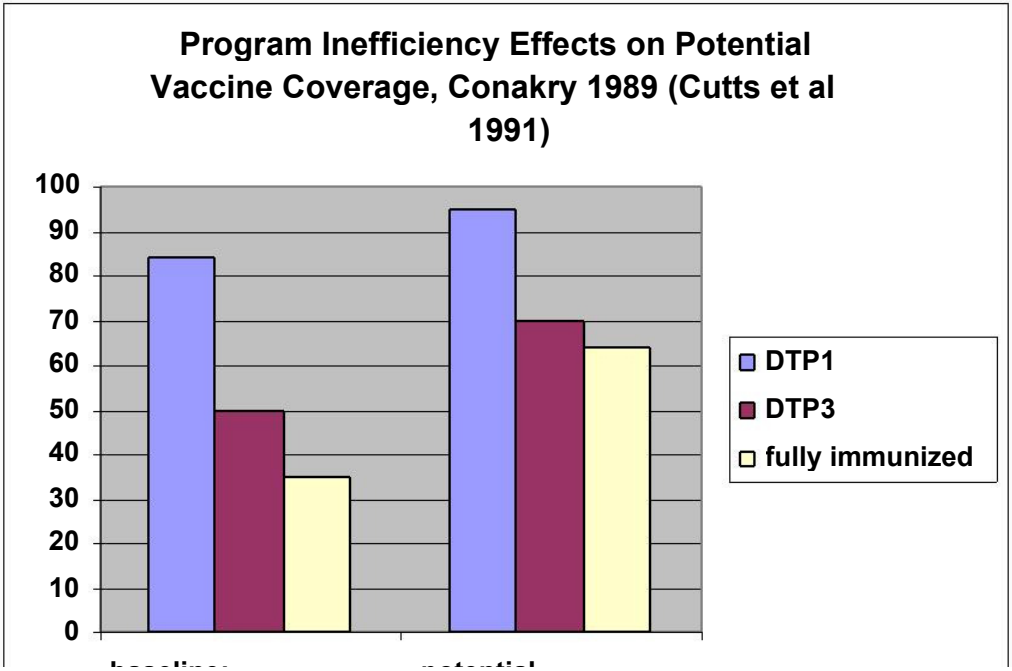
growth monitoring	81	70-96

Pushed up in 87



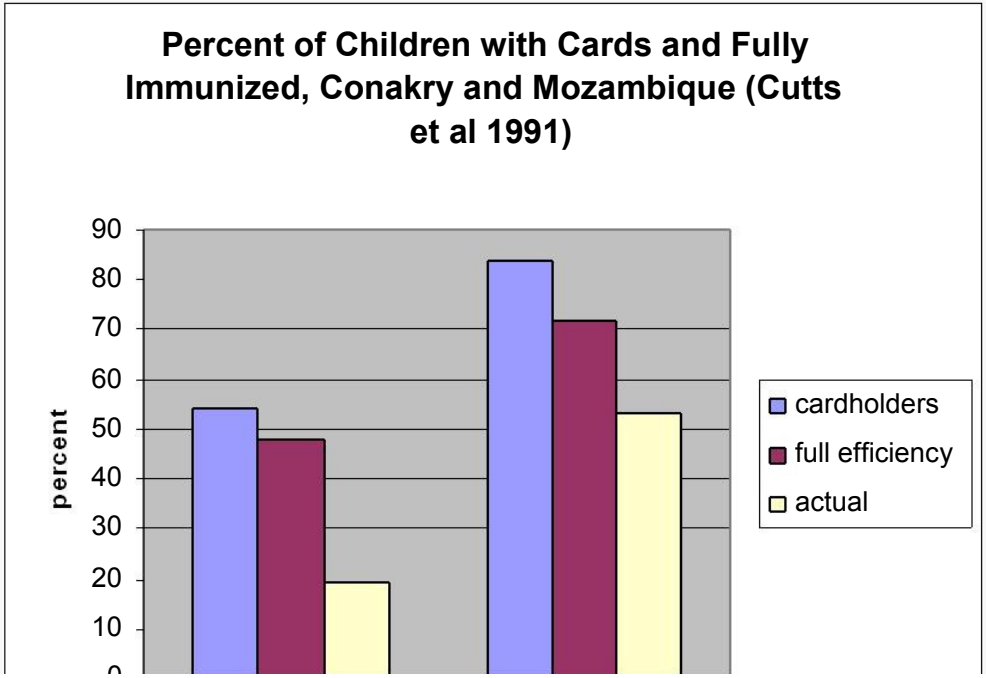
20

What Could Have Happened




baseline:
vaccinated
correctly
potential
coverage
21

Side by Side



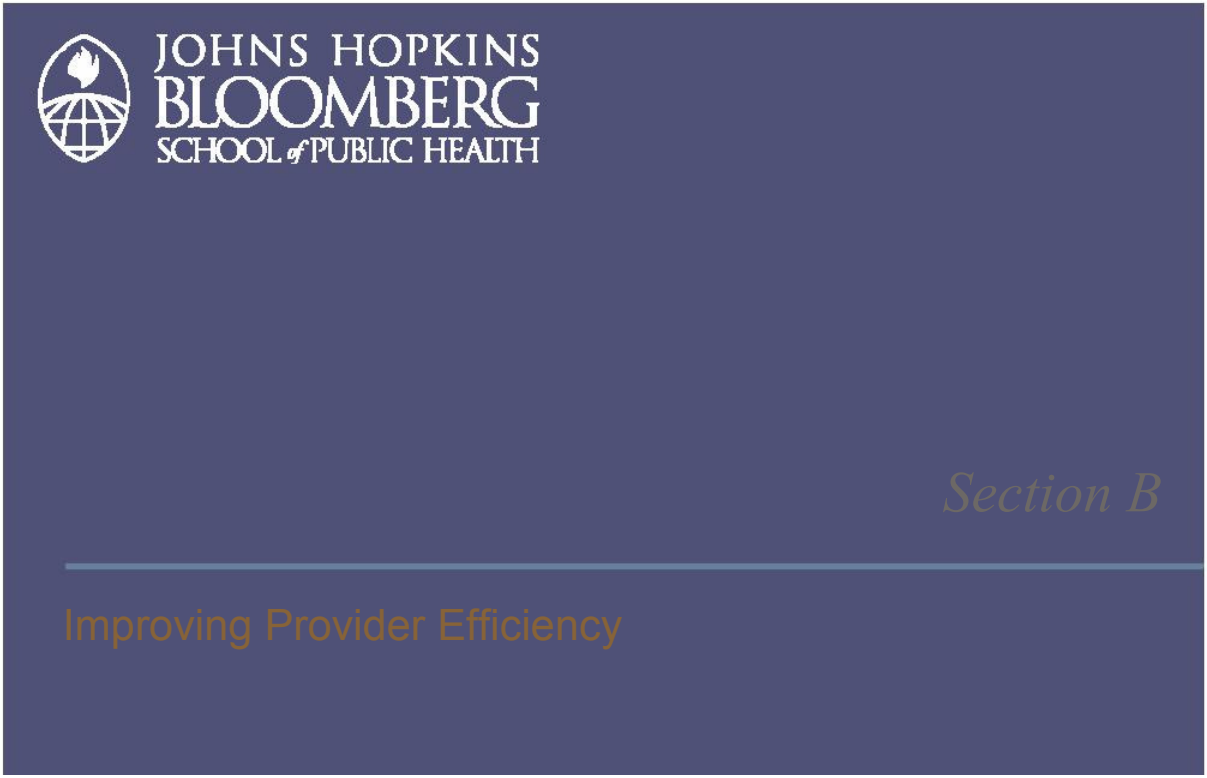

0
Conakry
Mozambique
22

Summary

Eliminating timing errors and missed opportunities would significantly impact immunization coverage rates

However, as Cutts et al (1991) demonstrated, high dropout rates may still depress coverage

23


JOHNS HOPKINS
BLOOMBERG
SCHOOL of PUBLIC HEALTH
Section B
Improving Provider Efficiency

Improving Provider Efficiency

25

Strategies for Reducing Missed Opportunities

- Establish clear guidelines, standards for immunization
- Educate providers
- Provide feedback about missed opportunities and immunization rates
- Modify office practices to change standards of care
- Provide incentives

Notes Available 26

Supervision

A good supervisor

- Focuses on *performance* problems
- Does not threaten or confront but constructively criticizes
- Uses established assessment criteria
- Provides positive feedback, incentives public recognition for a job well done
- Maintains confidentiality

In recent years, new approaches to supervising health workers have emerged

Here are two:

- Peer

Peer training/supervision

- CDOs APIX system

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An Example of Peer Supervision

Robinson et al (2001) studied a peer training intervention in Maluku Province, Indonesia, in 19931994

Theory: peer trainers are a non-threatening supplement to hierarchical classroom training

Intervention: immunization nurses spent 12 weeks with peers at 15 low-performing health centers

Continued 28

An Example of Peer Supervision

Methods

- Non-randomized case control study
- Retrospective and prospective administrative data for each health center
- WHO cluster sample surveys
- Supervisory visits before and after
- Trainers assessments

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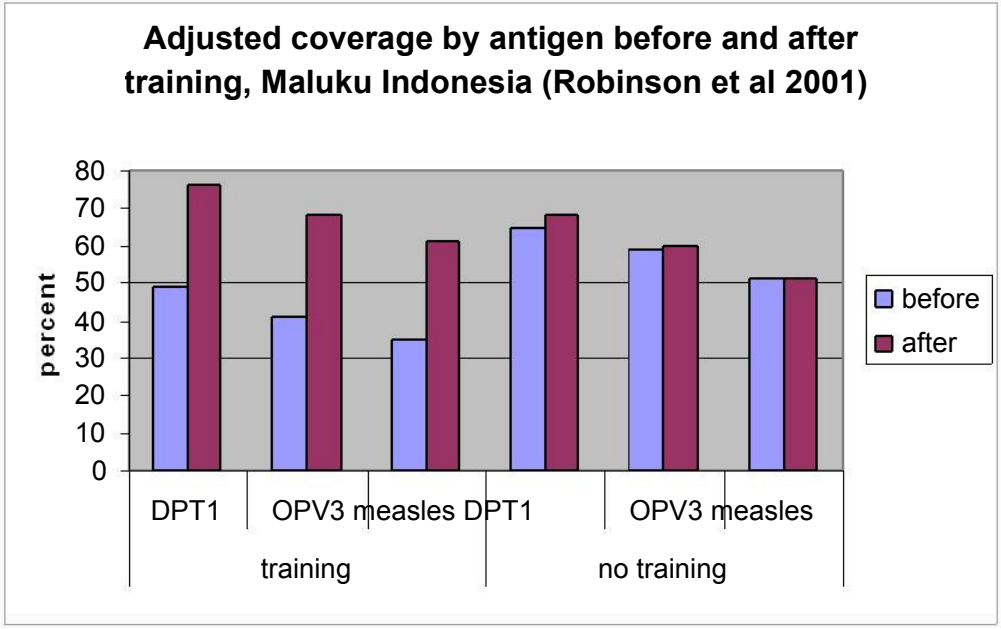
Adjusted Coverage



30

Results: Performance

30% improvement in key immunization practice scores, especially:

- Daily refrigerator temperature control
- Record-keeping, on-time reporting
- Vaccinating mildly ill children

High acceptability among hosts, trainers

Cost: U.S.$53 per trainee, U.S.$0.05 per dose

31

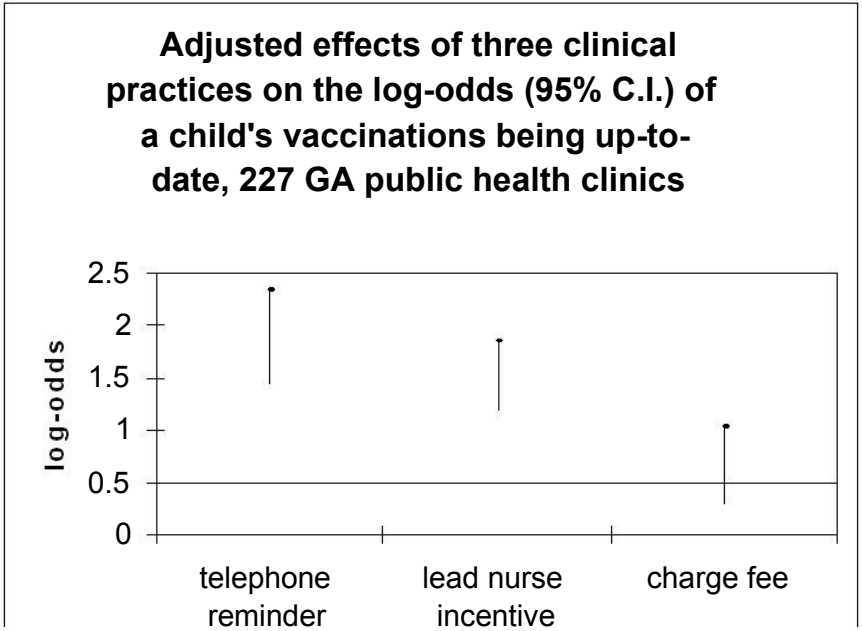
AFIX

Over the period 1988-94 the state of Georgia developed the AFIX system:

- **A**ssessment of center performance
- **F**eedback of assessment results
- **I**ncentives to improve performance
- e**X**change of performance data among centers

Notes Available 32

The Georgia Experience



Notes Available *Continued* 33

The Georgia Experience

Theory

- Assessment with feedback creates awareness necessary for behavioral change
- Incentives and public recognition are powerful motivators of behavioral change
- Awareness of how others are doing (reflexivity) motivates improvement

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Assessment

Standardized routine collection, analysis and summary of immunization records

Purpose

- Diagnose delivery problems
- Identify useful changes in policy and practice
- Monitor, refine interventions

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Feedback

Return of diagnostic information to front-line staff and decision makers

Purpose

- Monitor progress toward goals
- Motivate to improve
- Develop local solutions

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Incentives

Provide extrinsic motivation to improve performance

Purpose

- Recognize accomplishments
- Enhance pride in workmanship
- Reinforce sense of organizational mission

37

eXchange of information

Comparison to peers

Purpose

- Compare process and outcome indicators
- Exchange ideas among peers
- Provide mutual support
- Stimulate friendly competition

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Types of problems identified

- Late starts
- Non-adherence to recommended schedule
- Children falling behind schedule
- Children dropping out of system
- Ineffective reminder/recall strategies
- Failure to give vaccines simultaneously
- Inadequate record-keeping

Continued 39

To identify clinic-specific problems

- Compare each variable across sites
- Compare each variable temporally
- Compare variables within each site

Results are presented

- At exit interviews with local staff
- In conferences with decision-makers
- At workshops with providers
- As a challenge
- To encourage creativity

Continued 40

AFIX

LeBaron et al (1999) documented the introduction of AFIX in four states and two cities

In 1994, clinic-based coverage (4:3:1, ages 19 35m) was lower than population-based coverage (determined by National Immunization Survey)

During 199496 clinic-based coverage rose an average of 11% per year

- A rate faster than population-based coverage increases in 5/6 sites

Continued 41

AFIX

- Most of the initial increases were due to improved clinic record-keeping
- Net of this documentation artifact, average annual improvement rate was 5%
- Average cost per site: U.S.$49, 533/yr (U.S.$2/child)
- Recommendation: generalize AFIX nationwide

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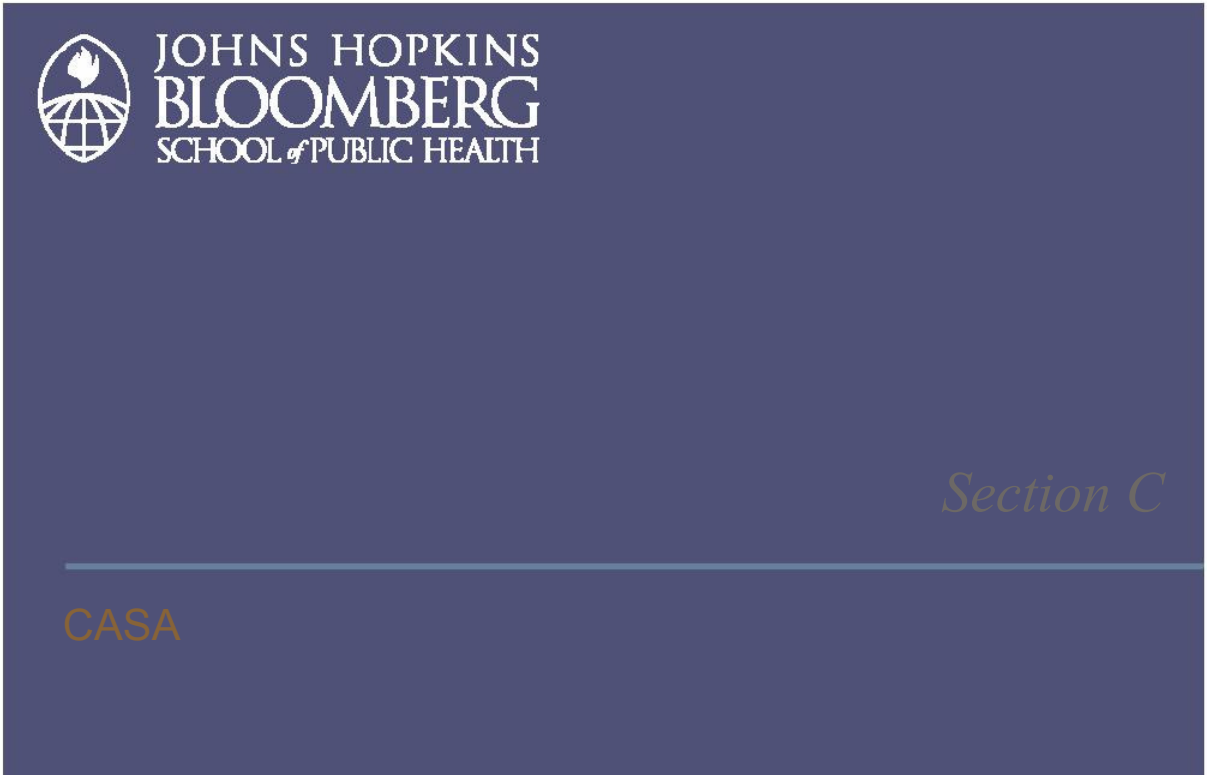

AFIX Tool: CASA

Main assessment tool: CASA

Methods

- Enter a random sample of individual vaccination records from clinic or an immunization register
- Analyze age-appropriateness, missed opportunities for different antigen combinations, demographic sub-groups
- Prepare specific reports

Examples

- Up-to-date status by age group, antigen
- Lists of incompletely

- Lists of incompletely immunized children
- Frequency, types of missed opportunities
- Quality of documentation

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AFIX Tool: CASA

Provide feedback on

- Key findings: coverage, practices
- Strengths of the site
- Areas for improvement
  - Documentation
  - Missed opportunities
  - Reminders, recalls
  - Parent, provider education
  - Vaccine handling, techniques

Brainstorm local solutions

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Update

A Publication of the Maryland Vaccines For Children Program

April 8, 2002 Volume 3, Issue 2

Selected Results of VFC Site Reviews, June 2001—January 2002

Number Of Reviews	Number of Records	Percent of Children Complete	Percent Incomplete Due to "Missed Opportunities"	Percent Inadequate Vaccine Storage
380	5,789	80%	10%	7%

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CASA Methods

Create incentives for improvement

- Examples
  - Identify local resources to tap
  - Leave free materials, upgrades
  - Offer training
  - Invite to present at conferences
  - Certificates, letters of commendation
  - Document, disseminate case studies

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CASA Methods

Exchange experiences, best practices via

- Lists of centers ranked by specific performance indicators
- Documented evidence-based strategies
- Conference presentations
- Peer exchanges, mentoring

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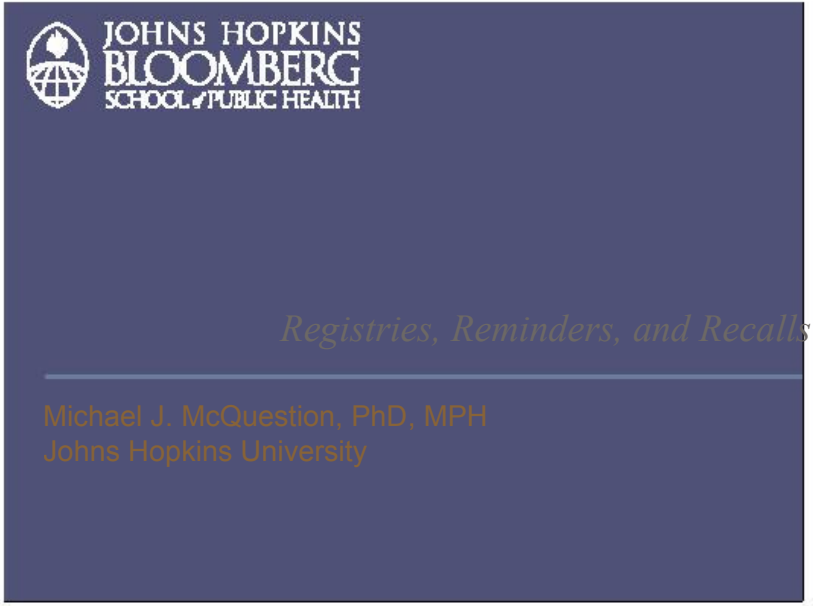
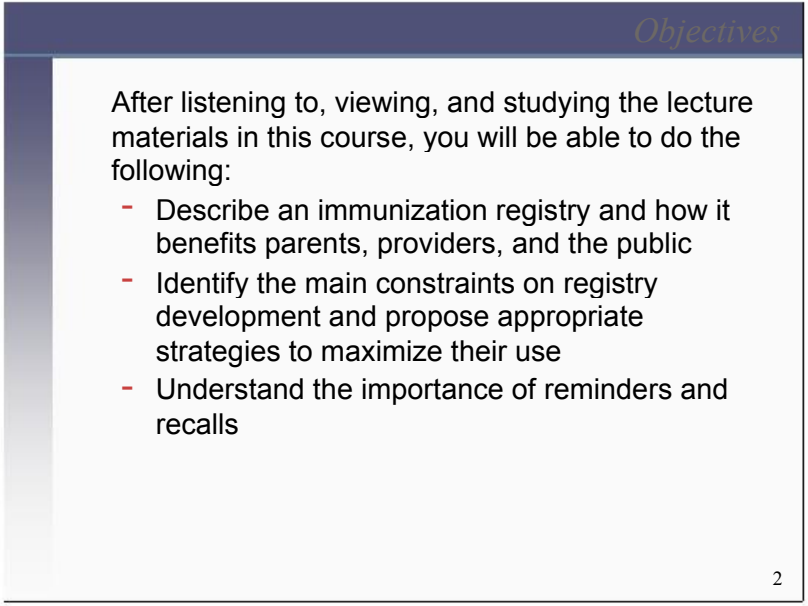
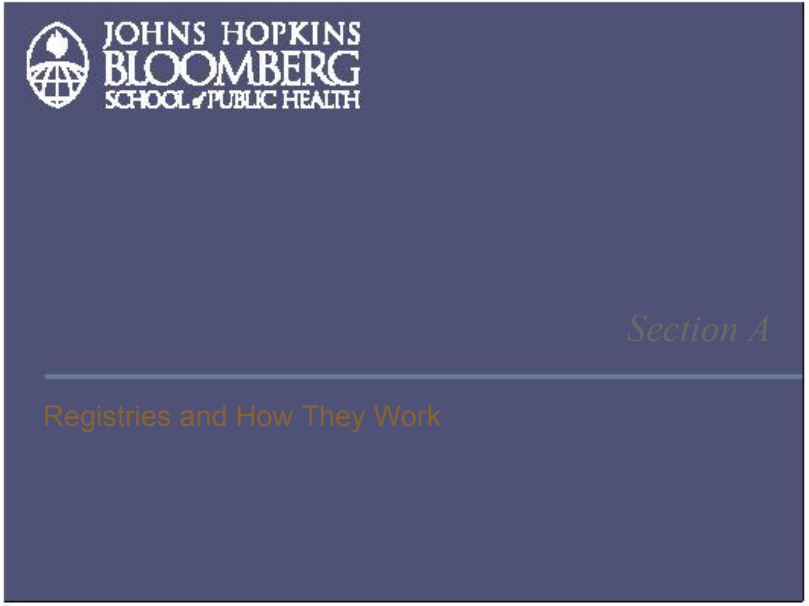
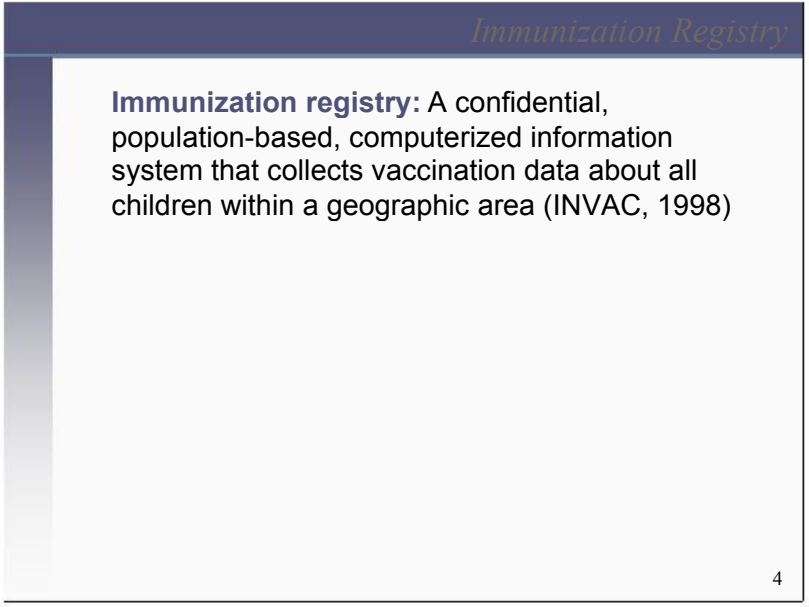
Summary

Vaccine provider inefficiencies, like other performance problems, are usually remedied by good supervision and feedback









History of Immunization Registries

The earliest U.S. immunization registries date back to the 1960s

These were manual tracking systems using birth certificates to monitor individual catchment areas

1974: Delaware launched the first statewide registry; it continues to capture data from all vaccine providers

In 1980, CDCs National Immunization Program (NIP) developed the first computer-based registry, the Automated Immunization Management System (AIMS)

The initially slow response to the 198991 measles epidemic convinced many public health practitioners of the need for a nationwide immunization registry

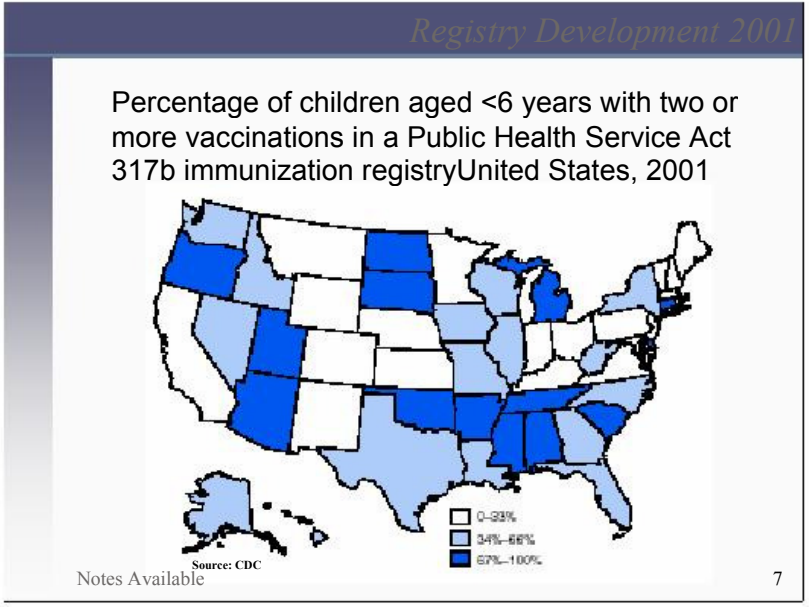
Continued 5

History of Immunization Registries

Since 1993, CDC and the Robert Wood Johnson Foundations All Kids Count program have provided over $262m to develop registries in all 50 states

Today, registries cover about 44% of U.S. children

6

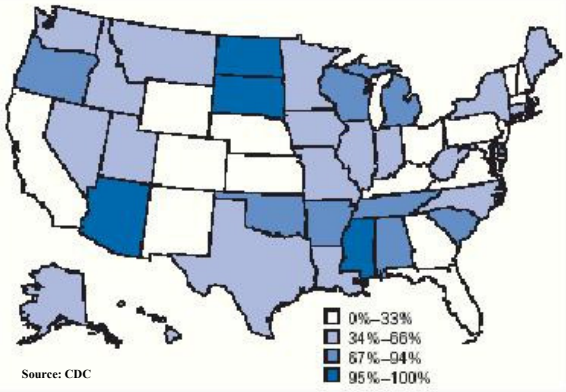

Registry Development 2001
Percentage of children aged <6 years with two or more vaccinations in a Public Health Service Act 317b immunization registryUnited States, 2001
0–33%
34%–66%
67%–100%
Source: CDC
Notes Available
7

MMWR.

2002. Vol
51/No.34,
161.

Registry Development 2002

Percentage of children aged <6 years with two or more vaccinations in a Public Health Service Act 317b immunization registryUnited States, 2002



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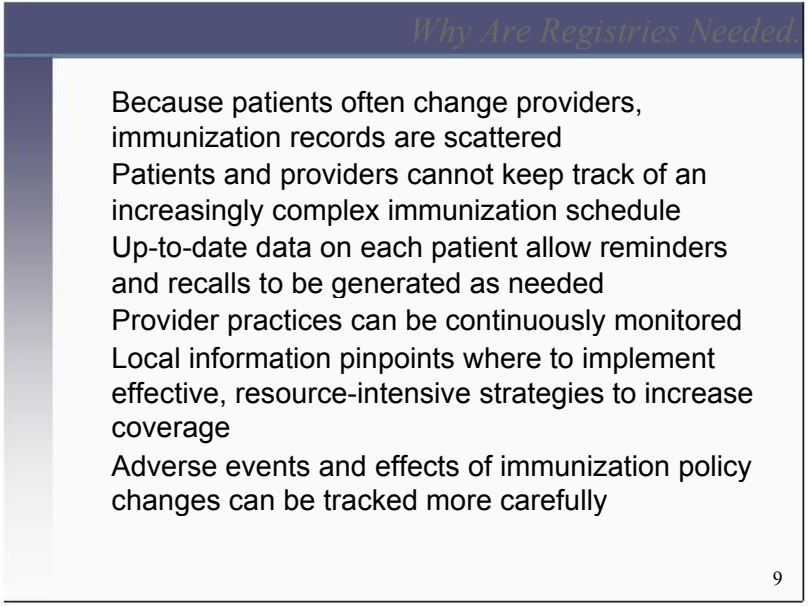

Why Are Registries Needed.
Because patients often change providers, immunization records are scattered
Patients and providers cannot keep track of an increasingly complex immunization schedule
Up-to-date data on each patient allow reminders and recalls to be generated as needed
Provider practices can be continuously monitored
Local information pinpoints where to implement effective, resource-intensive strategies to increase coverage
Adverse events and effects of immunization policy changes can be tracked more carefully
9

Case Study: The Scattered Records Problem

Stokley et al (2001) studied immunization histories from the 1995 U.S. National Health Interview Survey (NHIS)

- Found that 22% of children aged 1935 months received vaccinations from more than one provider
- They then combined and analyzed provider records for those multiple provider cases

Continued 10

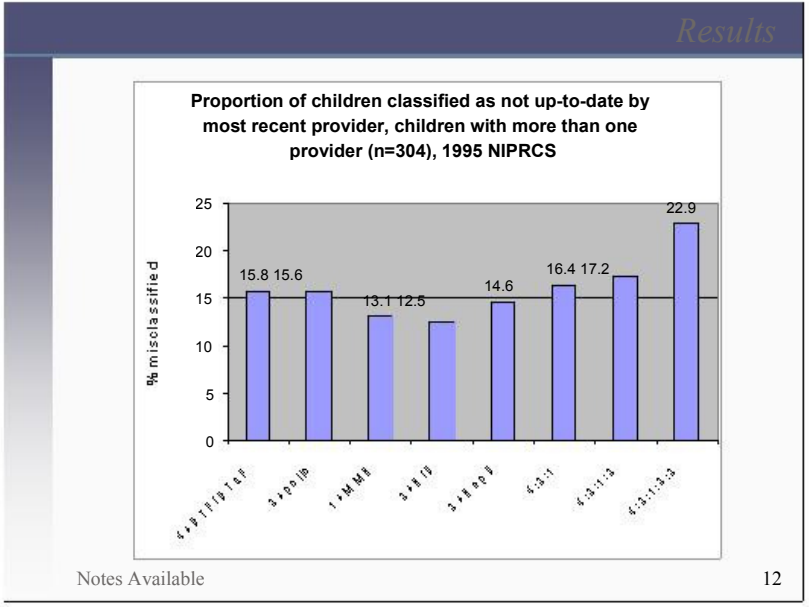
Case Study: The Scattered Records Problem

Findings

- Based only on the most recent providers records, vaccine coverage was underestimated by 1012%
- Based only on the first providers records, the underestimates ranged from 2746%
- Based on a randomly selection of all providers records, the underestimates ranged from 19 29%

The most recent providers misclassified 1323% of up-to-date children as not up-to-date

11


Results
Proportion of children classified as not up-to-date by most recent provider, children with more than one provider (n=304), 1995 NIPRCS
% misclassified
25
20
15
10
5
0
15.8
15.6
13.1
12.5
14.6
16.4
17.2
22.9
Notes Available
12

Source:

Stokley
et al
2001

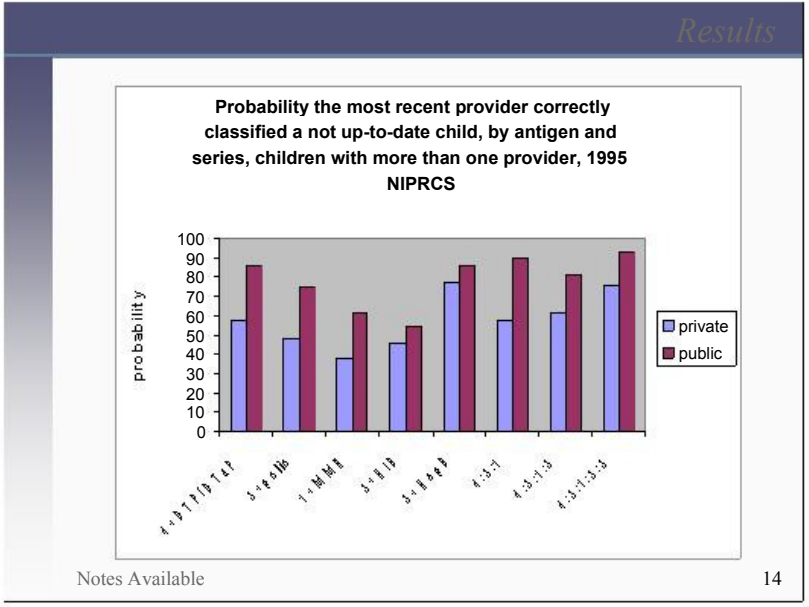
Case Study: The Scattered Records Problem

Of the most recent providers:

- 64% of the cases were private practices
- 23% public clinics

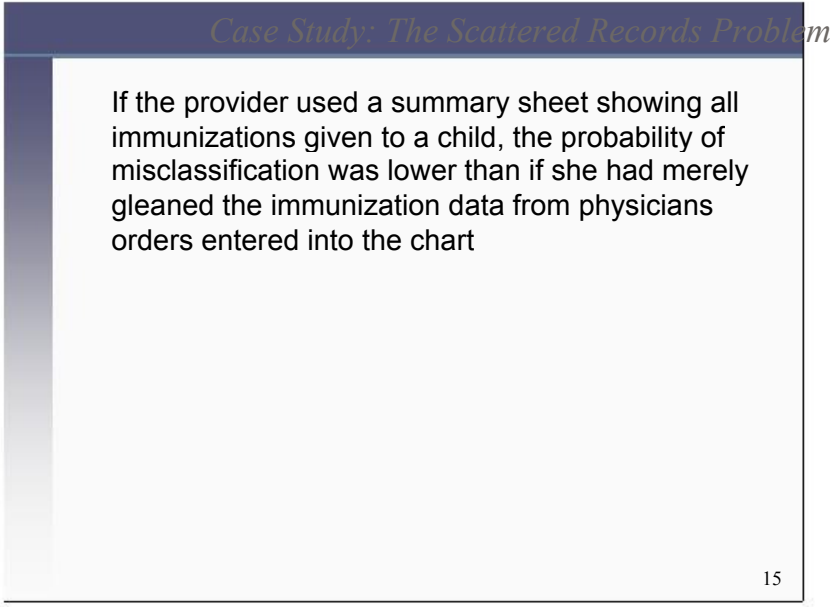
The probability that a child classified as not up-to-date really was not up-to-date for a given antigen or series was high for both types of providers

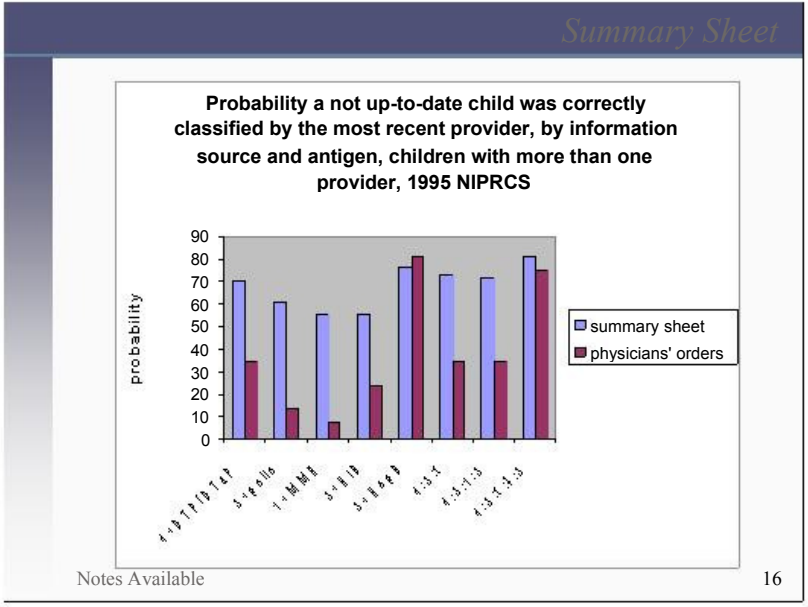
13



Source:

Stokley
et al
2001





Source:

Stokley
et al
2001

Case Study: The Scattered Records Problem

Conclusions

- At any given moment, 150,000 fully immunized children in the U.S. are incorrectly classified as needing more vaccinations due to scattered records
- Community immunization registries would greatly reduce the problem

17

Case Study: Effects of Policy Changes

Data from 250 facilities were extracted from Oklahomas state immunization registry in August, 1997

n~32,000 children born January 1, 1996 to June 30, 1997

Question

- Given a policy decision to use only IPV (injected), are cohorts of children as likely to be as up-to-date as those previously given OPV (oral).

18

Type polio dose 1 received by 3 months of age

Cohort	N	IPV	OPV	none
1996 Q1	5471	1%	66%	33%
1996 Q2	5788	1%	64%	35%
1996 Q3	5898	1%	61%	38%
1996 Q4	5118	2%	59%	38%
1997 Q1	4571	15%	49%	36%
1997 Q2	3744	31%	32%	37%

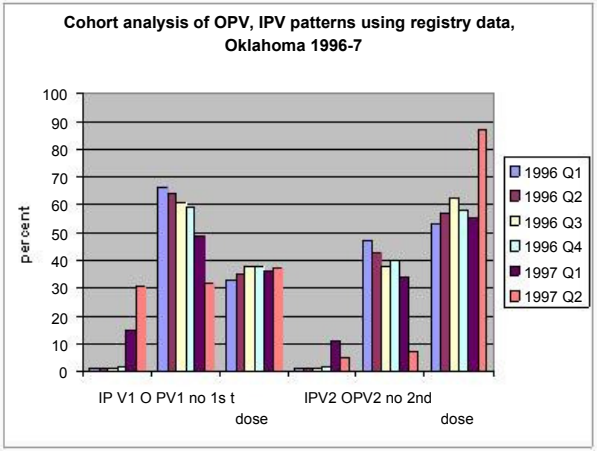
Continued

Type polio dose 2 received by 5 months of age

Cohort	N	IPV	OPV	none
1996 Q1	5471	1%	47%	53%
1996 Q2	5788	1%	43%	57%
1996 Q3	5898	1%	38%	62%
1996 Q4	5118	2%	40%	58%
1997 Q1	4571	11%	34%	55%
1997 Q2	3744	5%	7%	87%

20

Plotted Comparison



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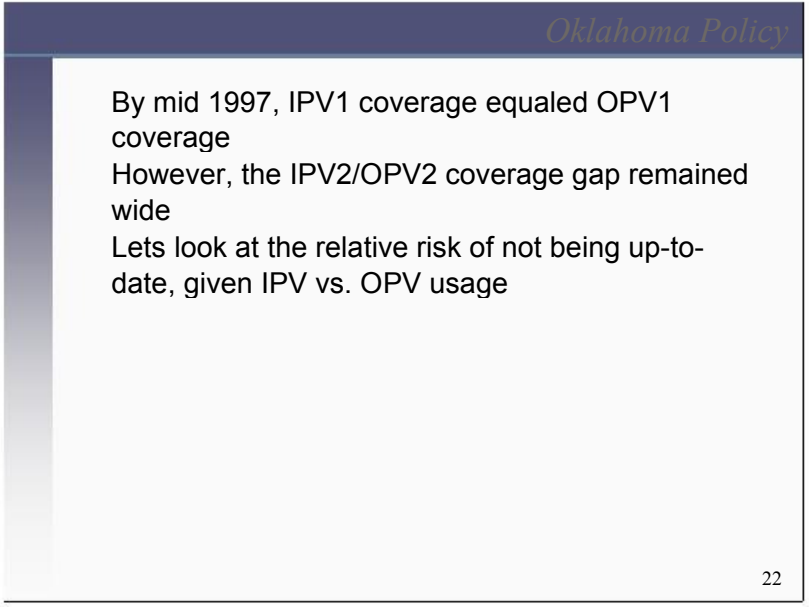
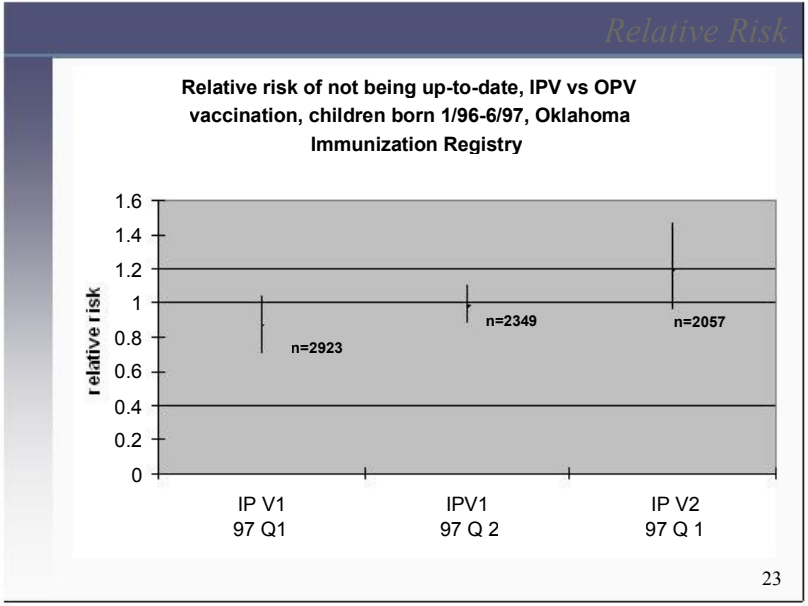

Oklahoma Policy
By mid 1997, IPV1 coverage equaled OPV1 coverage
However, the IPV2/OPV2 coverage gap remained wide
Lets look at the relative risk of not being up-to-date, given IPV vs. OPV usage
22



Oklahoma Policy

Overall, children who received IPV were as likely to be up-to-date than those who received OPV

Although statistically insignificant, the pattern suggests that children given IPV2 were less likely to be up-to-date than those in earlier cohorts who were given OPV2

Possible reasons

- Painful side reactions to IPV1
- Providers reluctance to give injections
- The vaccine policy shift

24

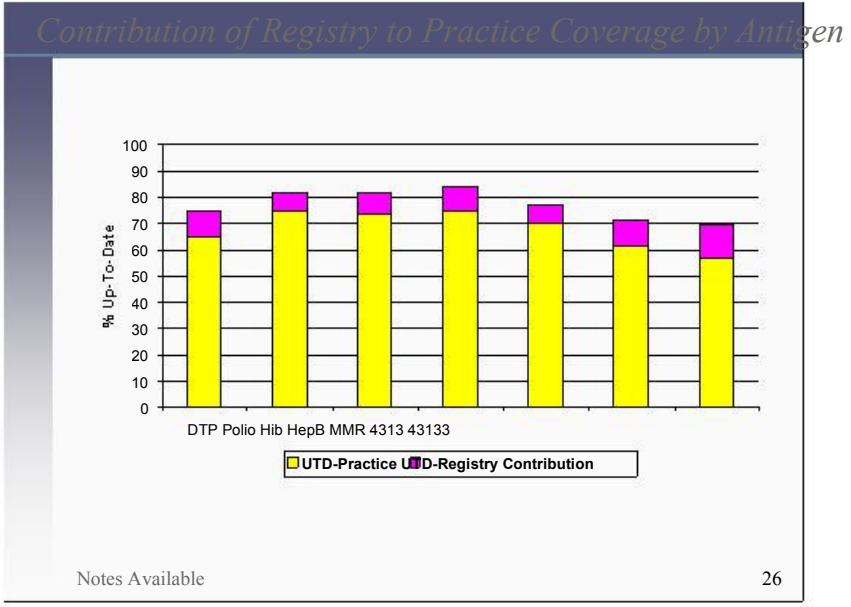
Registries Work

Where population-based registries are working and have attained high coverage, their results are more reliable than other data sources

Example: New York City (Irigoyen, 2000)

- 11 randomly selected pediatric practices compared to registry data
- Practice-based (CASA) assessments showed 61% UTD
- Registry data increased figure to 71%

25


Contribution of Registry to Practice Coverage by Antigen
100
90
80
70
60
50
40
30
20
10
0
% Up-To-Date
DTP Polio Hib HepB MMR 4313 43133
UTD-Practice UTD-Registry Contribution
Notes Available
26

Source:

Irigoyen
2000

This graph shows the up-to date rates by antigen and combination antigen. The yellow bar is the coverage levels as per the chart audits, and the pink bar on top is the contribution of the NYC registry. The contribution of the NYC registry was about 10%, and it varied by antigen. The antigens that required more doses showed the highest increase.

Registries Are Cost-Effective

Horne (1999) analyzed cost data from 16 registries

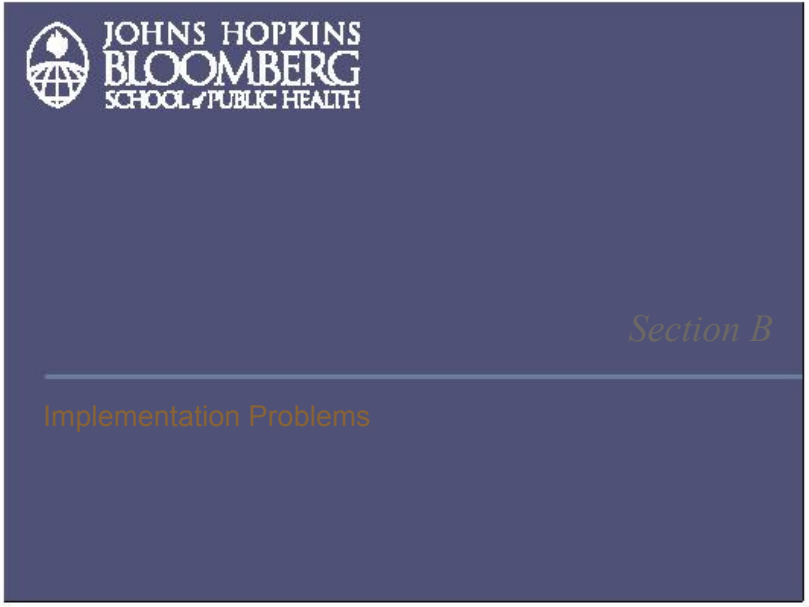
While developing, the registries spent an average of U.S.$16/child/year

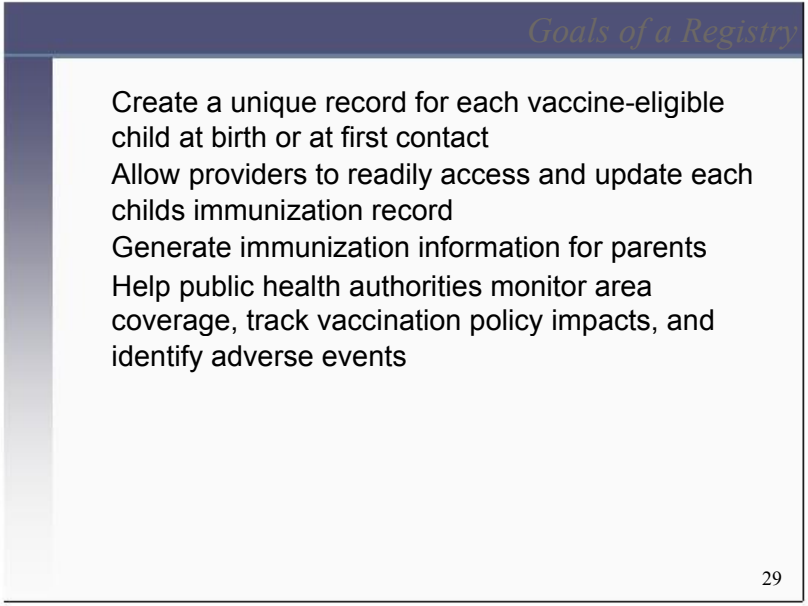
Once fully operational, costs were $4/child/year and $3/encounter

Extrapolating to national level

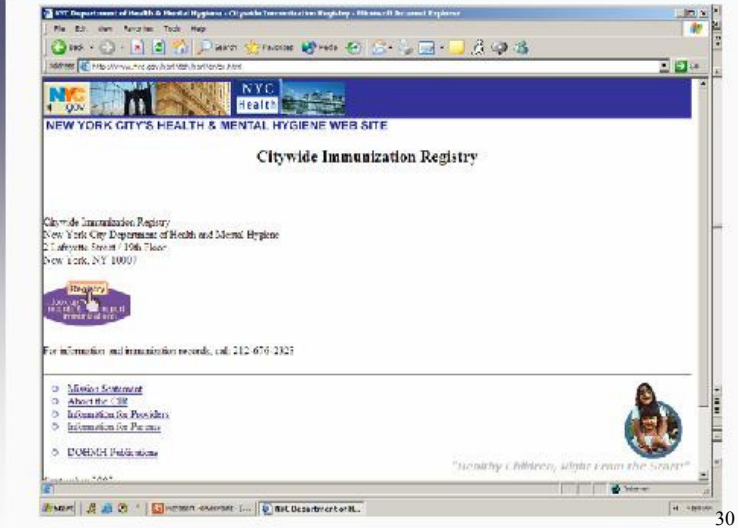
- Estimated annual cost of registries: $78.2m
- $5/child/year
- Estimated cost offsets: $107.5m
- Estimated annual savings: $29.3m

27




Goals of a Registry
Create a unique record for each vaccine-eligible child at birth or at first contact
Allow providers to readily access and update each childs immunization record
Generate immunization information for parents
Help public health authorities monitor area coverage, track vaccination policy impacts, and identify adverse events
29

Web Access to New York Citys Immunization Registry



30

Why Is Coverage So Low.

Most observers agree that registries are needed to meet these goals

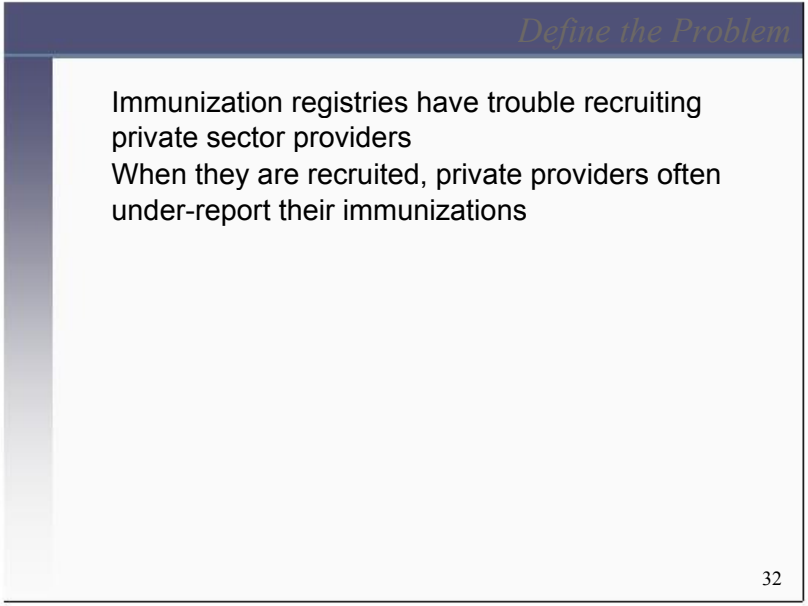
Yet, after over a decade of concerted efforts, registries reach only 44% of U.S. children

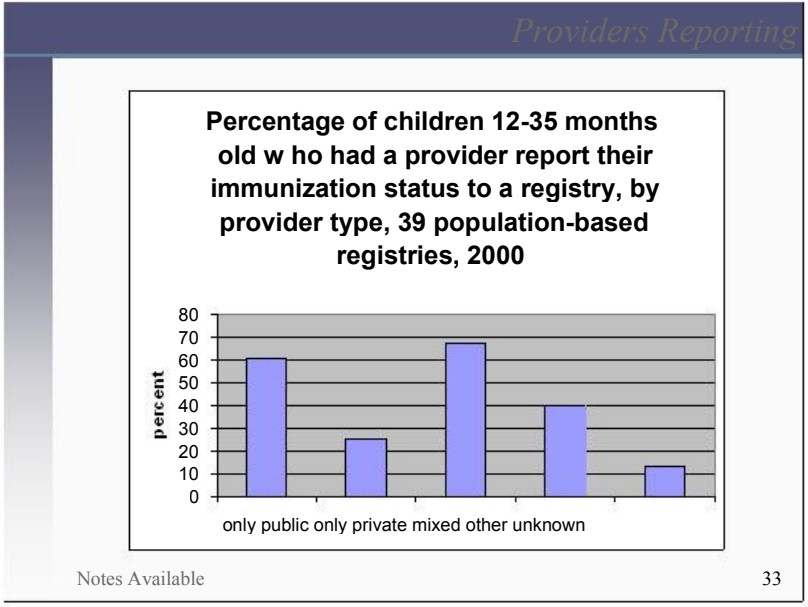
Why.

- A key problem is lack of private provider participation

Lets analyze this problem

31




Providers Reporting
Percentage of children 12-35 months old w ho had a provider report their immunization status to a registry, by provider type, 39 population-based registries, 2000
percent
80
70
60
50
40
30
20
10
0
only public only private mixed other unknown
Notes Available
33

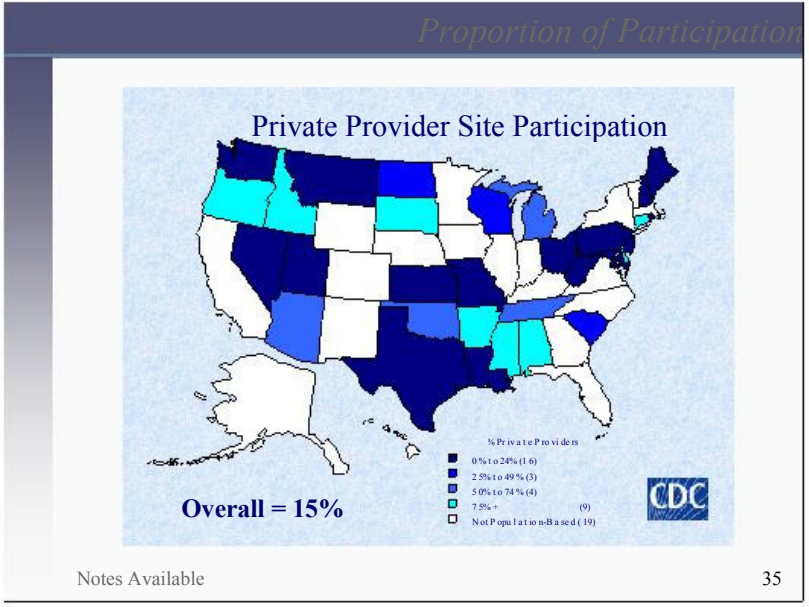
Source:

Linkins,
2000

Magnitude of the Problem

In 2000, 13% of public providers and 41% of private providers were enrolled in registries
Private providers account for 55% of all immunizations in the United States (LeBaron et al, 2001)

34



Source:

Linkins,
2000

Forces Determining Registry Participation

Federal and state governments oblige all providers (public and private) to report their performance and coverage indicators as a condition for free vaccine provision (Vaccine for Children Initiative)

About 70% of private providers participate

Most meet the reporting requirement using data manually abstracted from randomly sampled clinical charts (e.g., CASA)

Continued 36

Forces Determining Registry Participation

Political

- Private providers not involved from conception of registry
- Private providers fear the information will be used to evaluate them
- Private providers fear over-regulation

Technical

- Some private providers dont have PCs, Internet access
- Software for private providers to access registry data online not yet ready
- Need for ongoing technical support
- Providers doubt registry data quality

Continued 37

Forces Determining Registry Participation

Economic

- Registries create a new recurrent cost to private providers
- Economic benefits of registry participation not demonstrated

Other

- Few positive precedents cooperating with public sector
- Legal liability, confidentiality

38

Possible Interventions

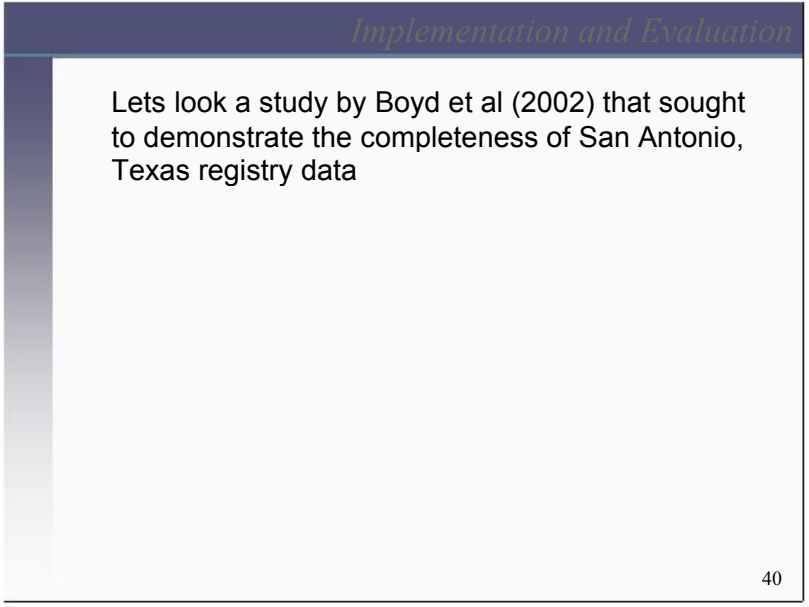
Political
- Invite private MDs to join State Registry Task Force

Technical
- Provide training, support for upgrading computer-based MIS in private practices, clinics
- Demonstrate quality, usefulness of registry data

Economic
- Cost-benefit analysis of registry participation

Other
- Indemnify (hold harmless) private providers from legal liability related to registries

39



Boyd et al (2002)

Methods

- Informal interviews identified lack of provider confidence
- CASA assessments of 77/210 clinics in 1998, 44 in 1999 and 10 in 2000 compared to corresponding registry record for each clinic
- Indicator: 4:3:1 coverage (DTP, Hib, MMR), ages 1236 months

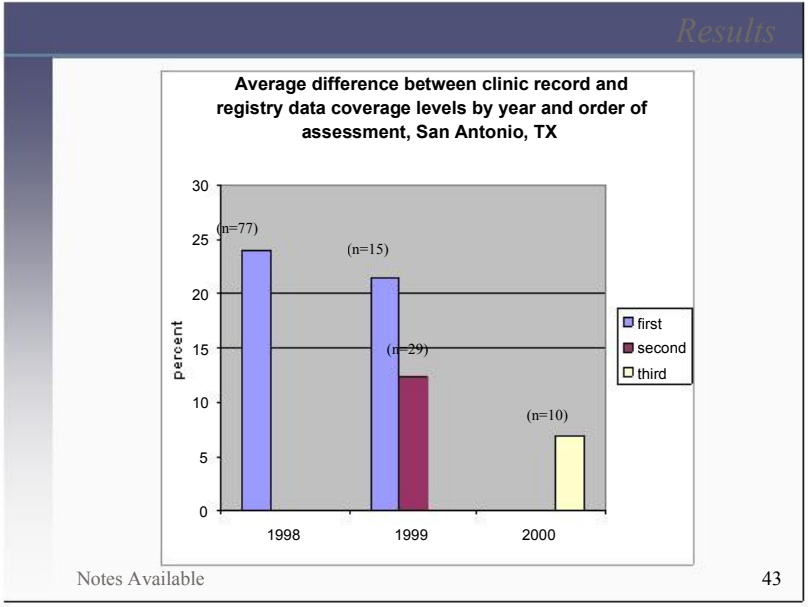
Continued 41

Boyd et al (2002)

Results

- Mean clinic-record coverage: 39.8%
- Mean registry-derived coverage: 64.1%
- Identical estimates in only 8/92 clinics; all other clinical record reviews showed lower coverage
- Differences diminished for 29 clinics reassessed in 1999 and 10 reassessed again in 2000

42


Results
Average difference between clinic record and registry data coverage levels by year and order of assessment, San Antonio, TX
30
25
20
15
10
5
0
percent
(n=77)
(n=15)
(n=29)
(n=10)
1998
1999
2000
first
second
third
Notes Available
43

Source:

Boyd
et
al
2002

Boyd et al (2002)

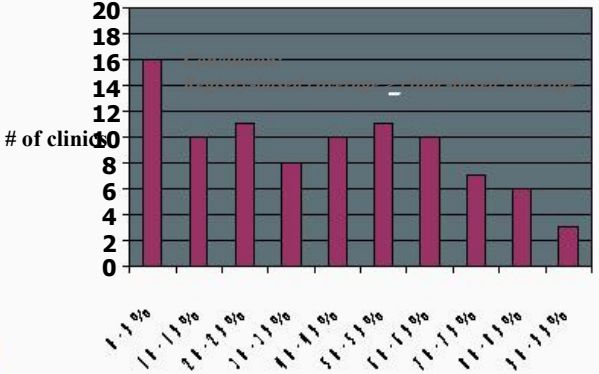
Conclusions

- Registry data more complete than clinic data in San Antonio, probably because it deals more effectively with scattered records
- Provider performance may improve with each successive CASA review

44

Results

Percent difference between coverage levels based on clinic-based vs. registry-based data, San Antonio, 1998-99, n=92 clinics (Boyd et al, 2002)



45

Problem Solving

Many more studies are needed to generate the evidence necessary to convince private practitioners to participate

But is science alone sufficient.

Consider the contrasting logics of public and private providers

- Public sector providers are expected to provide immunization information to states as part of their ongoing duties
- Private sector providers do not have this duty; their imperative is profitability

46

Alternative Strategies

Coercing private sector providers to participate by legislative mandate has not worked

When private providers perceive the value added by registries, they will participate

Examples of value added

- Point-of-contact efficiencies
- Goodwill of clients
- Public recognition

47

Costs Offset by Registries

Horne et al (2000) surveyed public and private providers participating in 16 All Kids Count II project registries

They analyzed 1997 data from the registries and from 15 private HMOs and clinics

Findings

- Mean cost/child in fully operational registry: $3.91
- Mean cost per encounter for manually retrieving childrens immunization records: $14.50

A second study of three CA registries (Fontanezzi, 2000) showed that:

- Worker productivity increased up to 50%

48

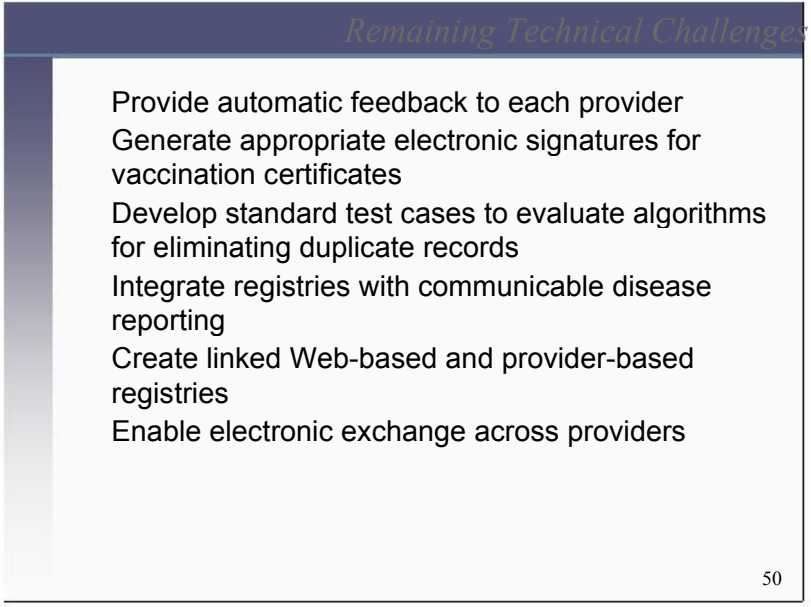
$ $

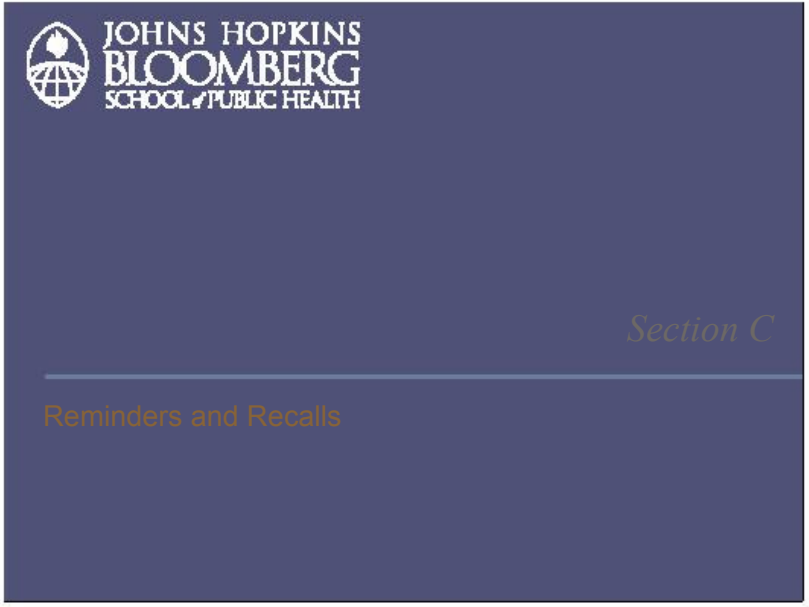
Other Provider Incentives

More provider incentives are needed, including:

- More cost-benefit, cost-effectiveness studies on provider registry use
- Creation of popular demand for registries
- Dissemination of lists showing participating providers
- Integration of registry interface into other provider software and existing health information systems
- Provision of regular feedback to providers

49





Definitions

A **reminder** is a notification that immunizations are due soon

A **recall** is a notification that immunizations are past due

Providers direct reminders and recalls to patients; registries allow them to be directed to patients and providers alike

Reminders and recalls are relatively inexpensive and effective

They may be linked to other programs and services

52

Provider Reminders

Chambers et al (1991) performed an experiment to assess the effects of computer-generated reminders on the probability that clinicians gave influenza vaccination to eligible patients

Methods

- Reminders were incorporated into computerized clinical encounter forms for every visit
- When the bill was paid, the reminder was removed

53

Chambers et al (1991)

Physicians were randomized into three groups: Always Reminded, Sometimes Reminded, Never Reminded

Results

Group	*% immunized*	*n*
Always reminded	51	271
Sometimes reminded	38	72
Never reminded	30	218

Continued 54

Chambers et al (1991)

Patient characteristics were not predictive of immunization but number of visits was

Attending physicians and fellows were more likely than residents to immunize

When the Sometimes-Reminded clinicians did not receive a reminder, they were less likely than the Never-Reminded clinicians to immunize the patient

Continued 55

Chambers et al (1991)

The authors checked the charts of those unimmunized by Always-Reminded clinicians

- One-half of the charts showed no reason for not immunizing
- One-fourth had refused the vaccine
- 15% actually did receive the vaccination, but it was unrecorded on the encounter form

56

Chambers et al (1991): Conclusions

Simple provider reminders are effective overall, however:

- Compliance is greater when two or more clinicians discuss the case
- Clerical error rates remain high
- Clinicians become dependent on the reminders so they should be provided at every encounter

57

Client Reminders

While registries produce reminders and recalls listing the specific antigens needed, general reminders and recalls are also effective

Irigoyen et al (2000) evaluated different reminder methods in a New York City pediatric clinic serving a low-income population

58

Irigoyen et al (2000)

1,273 children ages 418 months were randomized to one of four groups

- Group P: postcards
- Group T: telephone calls
- Group P+T: both
- Group C: none

Results

- 94% of Group P and P+T received cards
- 53% of Group T and T+P received calls

Continued

Irigoyen et al (2000)

Children in any reminder group were more likely to keep their appointments

Highest kept appointment rate: group P+T

Children not UTD were less likely to keep appointments regardless of reminder method

Vaccination coverage rates significantly improved in Groups P and T

Cost per reminder: $0.67 (P); $1.58 (P+T)

60

Registry-Generated Reminders

In large organizations, the combined impact of a registry and real-time reminder/recall systems can be dramatic

61

Case Study: Kaiser Permanente

The HMO Kaiser Permanente covers 30% of Californias children

In 1998, Kaisers registry contained information on 2m patients and 11m vaccinations

The registry is used to generate reminders and recalls (outreach) and to generate point-of-contact reminders for providers (inreach)

Continued

Case Study: Kaiser Permanente

The inreach procedure prints an I on the charts of all incompletely immunized children

Over a two-week period in 1998, Is were printed on 1,074/3,462 (31%) charts

602/1,074 (56%) were immunized during the contact

Using the inreach procedure, 25% more children were immunized in the same two-week period than in 1997 (Lugg et al 1999)

63

Are Registries/Reminders Sufficient to Reach Everyone.

Perhaps not

Lynch (1994) studied determinants of immunization performance of Glasgow, Scotland general practice physicians

Scotland has a national immunization registry which includes a computerized system of reminders and recalls

Providers have cash incentives to attain high immunization levels in their coverage areas

64

Lynch (1994)

Despite the reminders and recalls, 25% of providers failed to meet the targets in 1991

Local poverty level and the amount of income the GP received for past immunization performance (bonuses expressed as a proportion of total revenue) were predictors of local vaccine coverage

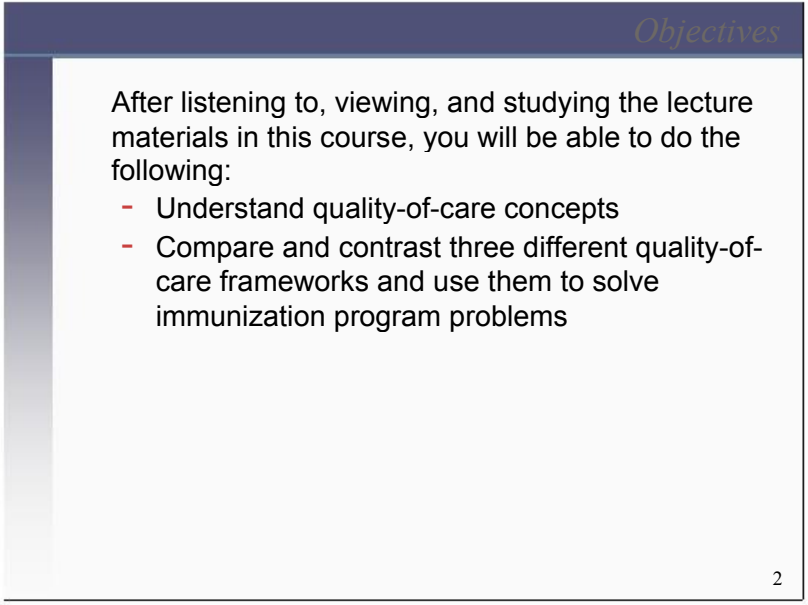
Conclusions: provider incentives, reminders, and recalls all help raise immunization levelsbut they cant entirely overcome health inequities

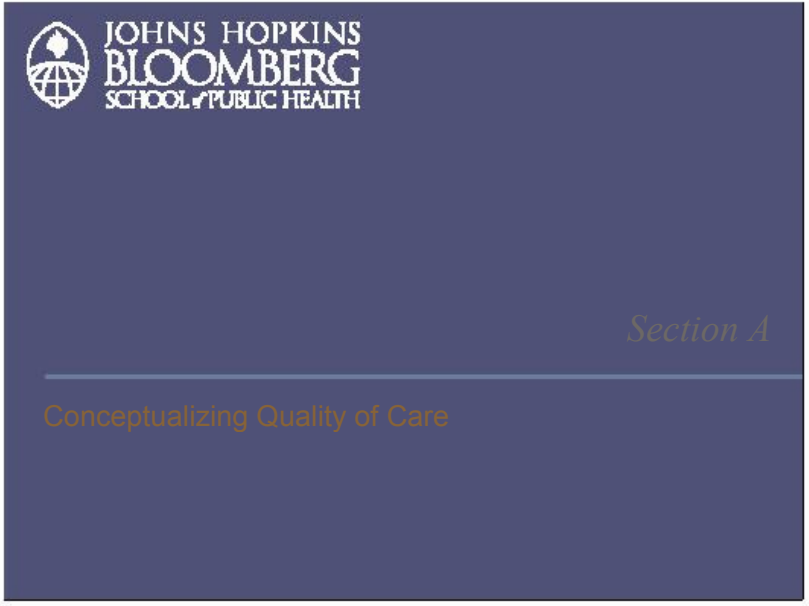
65

Summary

- Immunization registries are a superior method of tracking childrens immunizations and provider performance
- The main barriers to their use are their complexity and the reluctance of private practitioners to participate
- Reminders and recalls are effective in raising coverage rates
- Registries, reminders, and recalls may not be enough to overcome all health inequities

66





Quality of Care

Quality of care: The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge

Institute of Medicine, 1990

Notes

- This definition incorporates both treatment and prevention
- Desired health outcomes are those sought by the recipients of the services
- Current professional knowledge refers to ever-changing technical standards of care

4

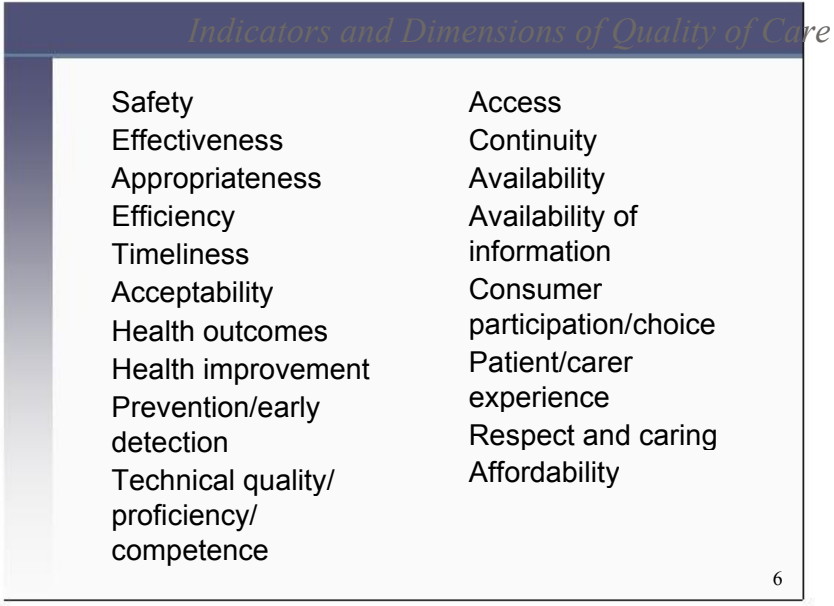
Why Emphasize Quality of Care?

Merely making health services accessible does not ensure they will be utilized

Research in many settings has shown that demand for immunizations and other primary health care services rises with the quality of those services

Conclusion: To attain and maintain healthy populations, countries must find ways to improve the quality of care on offer

5



The WHO-Recommended Quality-of-Care Framework

It is difficult, if not impossible, to rank these in importance or use them to construct a single measure of quality of care

To solve this problem, Evans et al (2001) conceptualized three intrinsic goals for any health system; an intrinsic goal is one for which attainment is desirable in itself, holding all other goals constant

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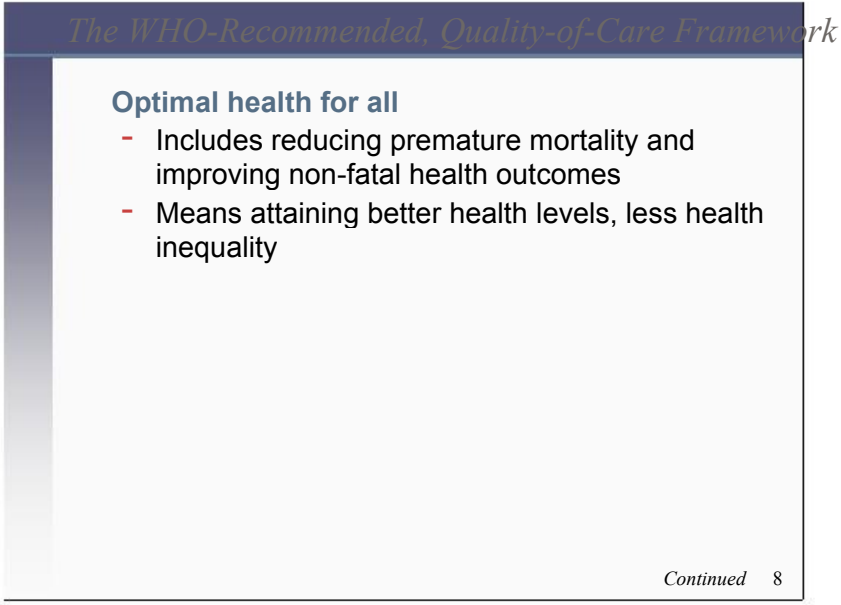
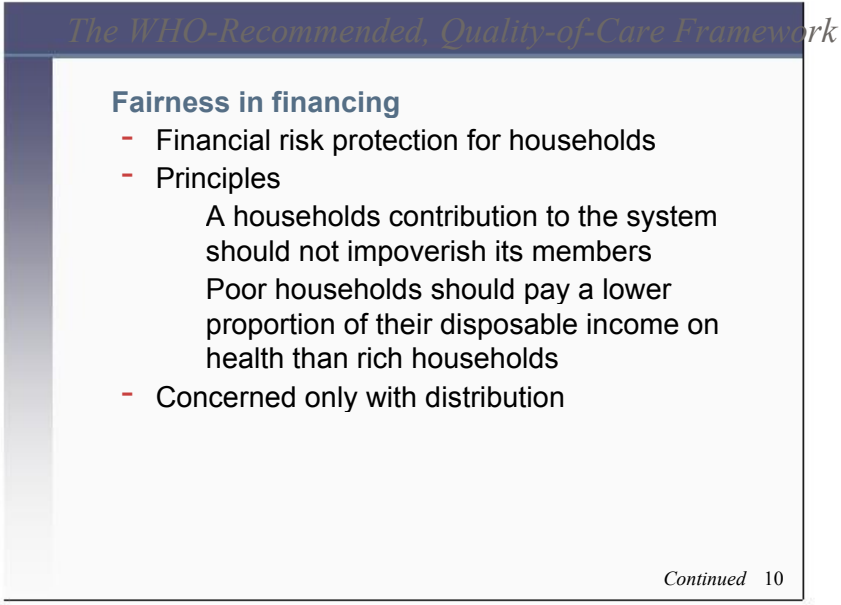


The WHO-Recommended, Quality-of-Care Framework

Responsiveness

- Meets legitimate non-health-related expectations of the population
- Two components
  - Respect for the person (dignity, confidentiality, need for information)
  - Client orientation (prompt attention, provision of basic amenities, choice)
- Means increasing the level of, and equalizing access to, responsive health services

Continued 9



The WHO-Recommended, Quality-of-Care Framework

Note that optimal health for all and **responsiveness correspond to the often cited technical and interpersonal quality-of-care** dimensions

The indicators and dimensions listed previously refer to instrumental goals for achieving these intrinsic goals

Heres how Evans et al mapped them together:

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Evans et Al

Goal	*Level of Attainment* or Quality	*Distribution of Attainment* or Equity
Optimal health	Health outcomes/improvement Technical quality/ proficiency/competence Appropriateness Effectiveness Safety Prevention/early detection Access/availability/continuity	Access/availability/continuity
Responsiveness	Consumer participation/choice Patient/carer experience Acceptability Respect and caring Availability of information Timeliness	
Fair financing		Affordability

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The Donabedian Quality-of-Care Framework

Most empirical quality-of-care research focuses solely on the instrumental goals

The most common framework is that of Donabedian (1980, 1986, 1988) who conceptualized three quality-of-care dimensions

Continued 13

The Donabedian Quality-of-Care Framework

Structure: the attributes of settings where care is delivered

Process: whether or not good medical practices are followed

Outcome: impact of the care on health status

Continued 14

The Donabedian Quality-of-Care Framework

The context (structure) in which care is delivered affects processes and outcomes

- (If the facility is an unpleasant place to be, people wont come, workers wont do a good job, and children wont be immunized)

Outcomes indicate the combined effects of structure and process

- (Child is up to date on vaccinations)

Structure and process are readily measured

- (Is the waiting room clean, the nurse polite.)

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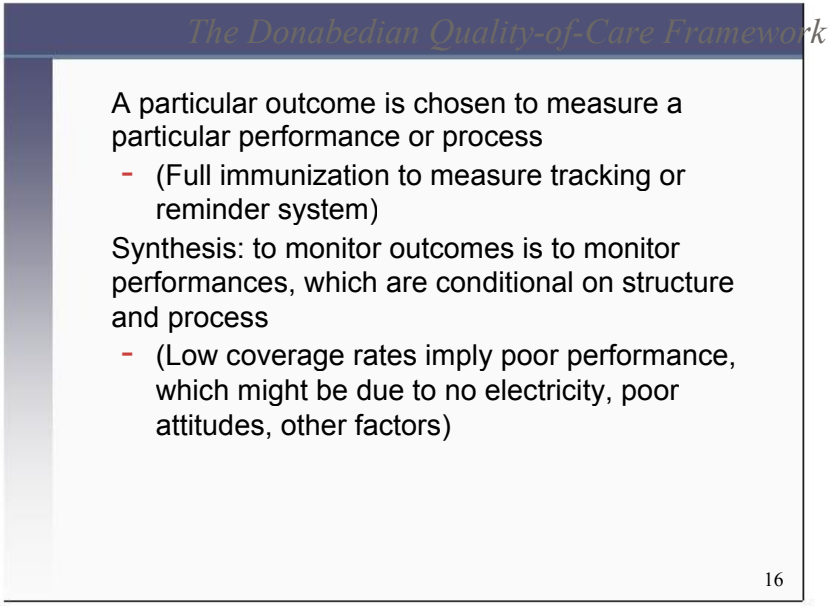

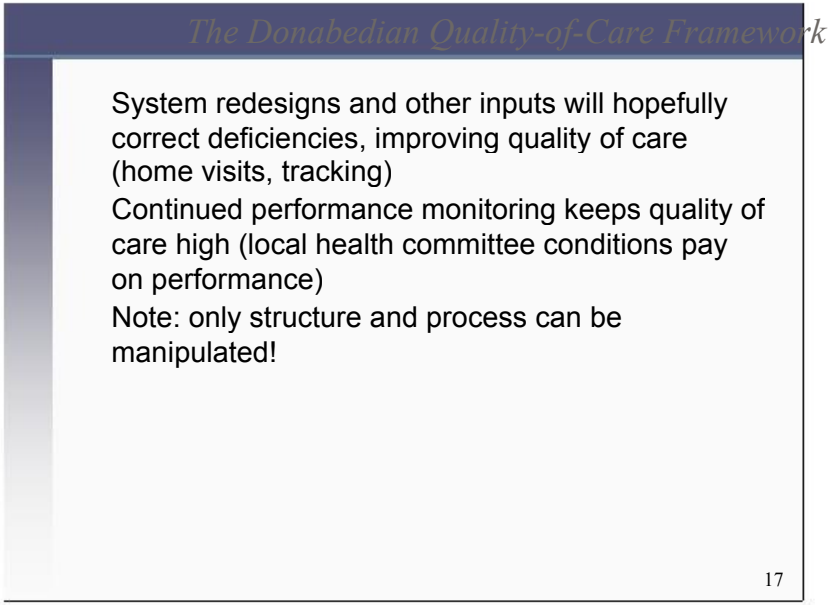

Examples of Donabedian Immunization Items

Dimension	How Measured
Structure	
Physical plant	Direct observation
Waiting time	Supervisory checklist
Process	
Client-provider interaction	Participant observation
	Exit interviews
MIS	Data quality assessment
Outcomes	
Vaccine coverage	Household surveys

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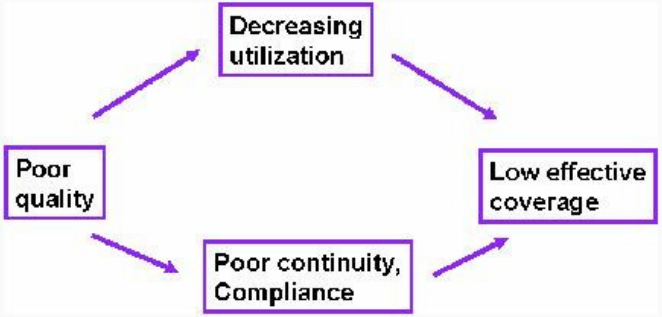
The Bamako Initiative

What to do about quality of care when the system is failing.

Many West African countries faced this kind of unhealthy equilibrium in the mid 1980s



Continued 19

The Bamako Initiative

Effectiveness

- Offer services that address the most important health problems of the most vulnerable groups
- Integrate curative and preventive services (maternal care, immunizations)
- Attain high population coverage

Efficiency

- Rationalize essential drug supply
- Routinely use information for decision-making
- Monitor costs

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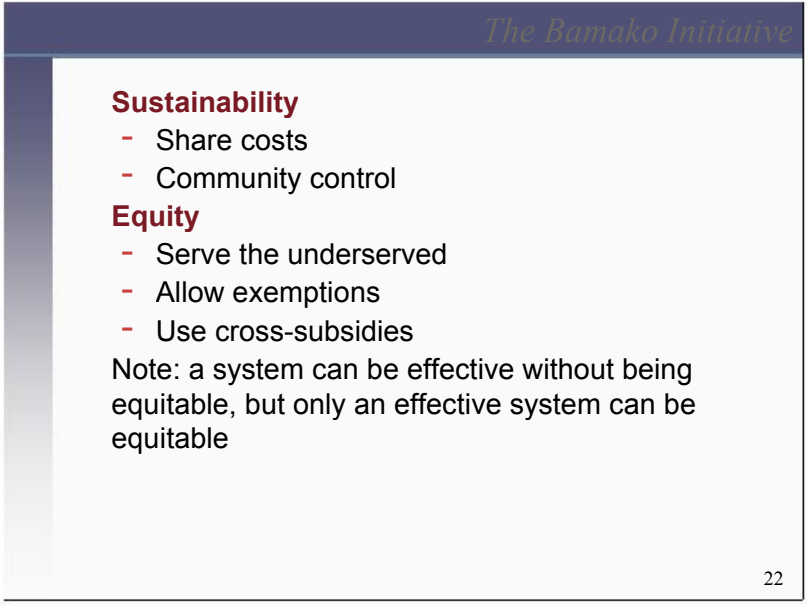

Summary

These three frameworks reflect three different ways to define quality of care:

- *WHO:* philosophical; universal right to high-quality health care
- *Donabedian:* organizational; health systems research
- *Bamako Initiative:* economic

Each can be used to analyze immunization program problems

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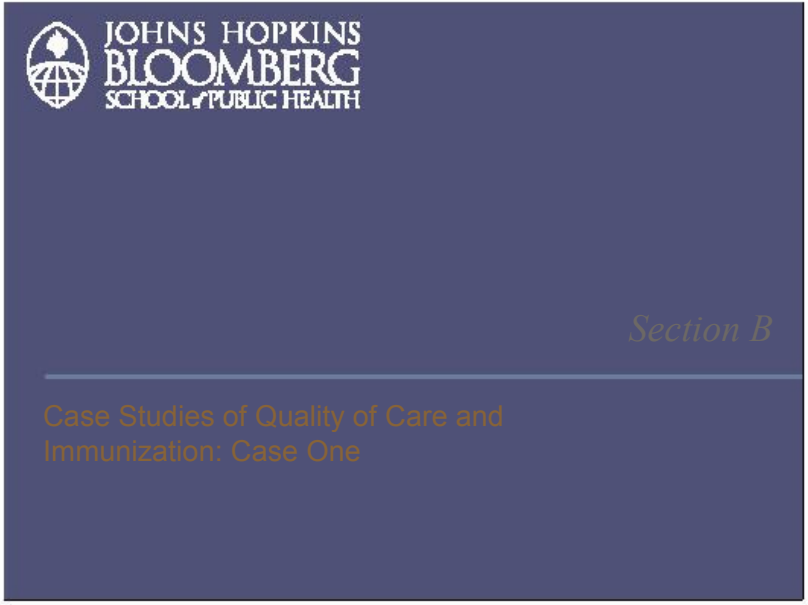

Case One: Dhaka, Bangladesh

Perry et al (1998) analyzed the quality of immunization services in Zone 3 of Dhaka (1994 population: 450,000)

1995 Dhaka coverage high: 59% 1223m fully immunized, 84% of mothers with child <12m immunized against tetanus

However, neonatal tetanus and measles caused 19% and 5% of infant deaths, and measles caused 16% of deaths ages 14y in urban Bangladesh in 1995

EPI infrastructure in Zone 3 (1994):

- 14/36 MCH-FP clinics give immunizations
- 57 fieldworkers visit Zone 3 households
- Azimpur Maternity Center

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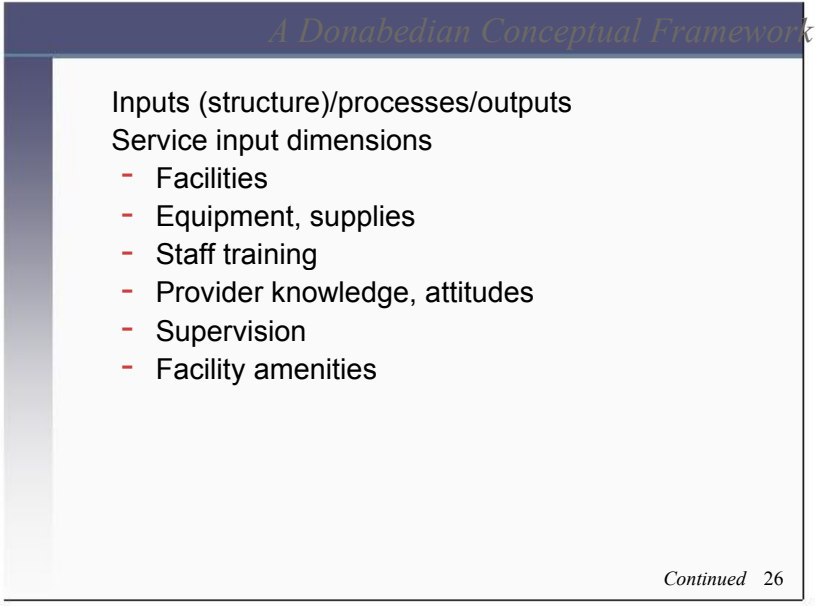

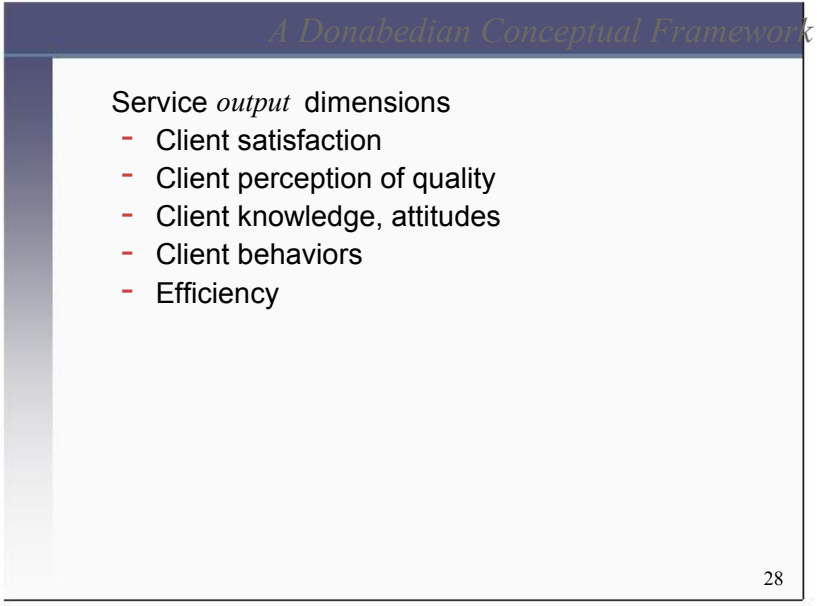

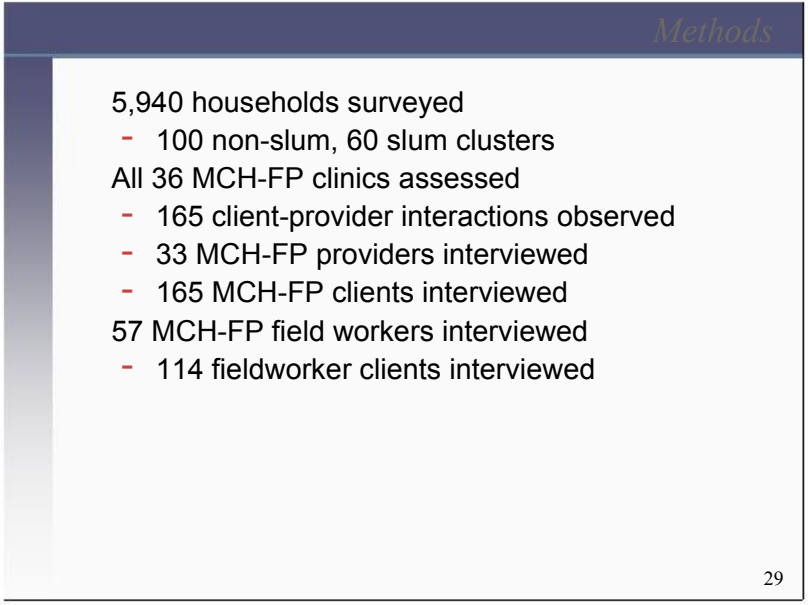

Results: Service Inputs

Equipment, supplies: Supply problems rare
Training: Adequate
Knowledge: Staff who regularly immunize were knowledgeable about EPI, *other staff less so*
Supervision: Regular but of *low quality*
Facilities: Physical amenities up to par

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Results: Service Processes

Services on offer

- EPI, MCH, FP well integrated

Technical quality

- Clinic staff regularly vaccinated all eligible children, pregnant women, and gave them cards
- Correct injection, sterilization technique followed
- No routine data analysis

Continued 31

Results: Service Processes

Counseling quality

- Fieldworkers promoted TT with pregnant women, but only 55% reviewed childrens immunization statuses during home visits
- Only 48% of mothers informed about side effects
- Immunization statuses checked for only 11% of children accompanying mothers visiting for other reasons
- Estimated 44% of children had missed immunization opportunities
- Estimated 87% of women had missed TT immunization opportunities

Continued 32

Results: Service Processes

Interpersonal relations

- Nearly all client-provider encounters rated as respectful, friendly, informative
- 93% of clients rated clinics as friendly, 83% found encounter educational

Continued 33

Results: Service Processes

Access

- Slum households have more difficult access to fixed facilities
- None of the clinics open every day
- Household survey showed
  - 61% of mothers with children 02y had immunization cards
  - 23% of mothers with children 011m had TT cards
  - 90% of children 023m had at least one vaccination
  - 68% of ever-pregnant married women had received at least one TT vaccination

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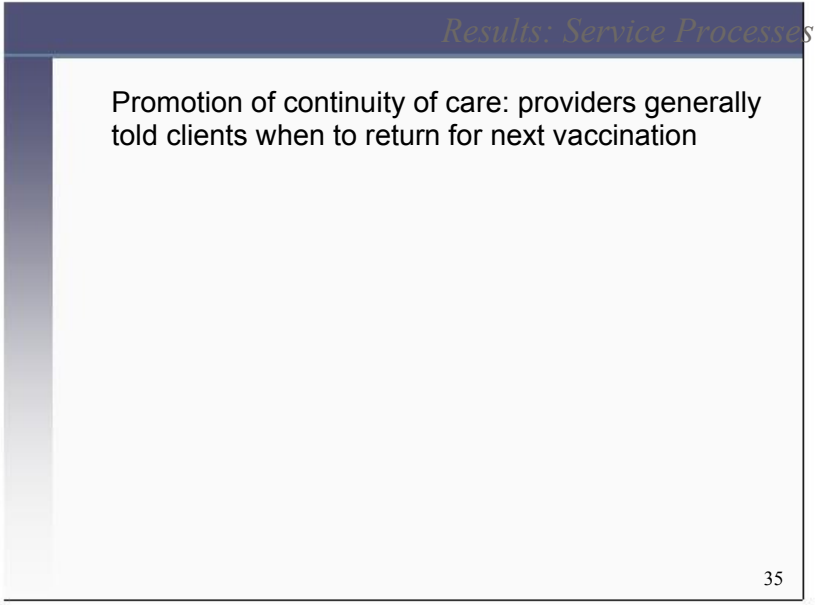

Results: Service Outcomes

Client satisfaction: 98% satisfied

Client perception of quality: 96% would recommend the clinic to a friend

Client knowledge

- Only half said vaccines prevent vaccine-preventable diseases
- 23% of TT eligible women did not know TT was available in the clinics they visited

Continued 36

Results: Service Outcomes

Client attitudes
- 68% of women plan to get TT
- 22% of younger women fear TT

Efficiency: good
- Median 27 clients per immunization session
- Median clients per worker per session: 18

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Recommendations

In this case, most of the problems detected were in the process dimension

To improve quality, the authors concluded, remedial efforts should first address:

- Missed opportunities
- Poor accessibility in slum areas
- Low knowledge about immunization among mothers and providers

Continued 38

Recommendations

Note: This was a cross-sectional study, so the performance monitoring function in Donabedians model was not operating

True quality assurance entails implementing the recommendations and continuing to monitor performance

The importance of the monitoring function is evident in the next case study

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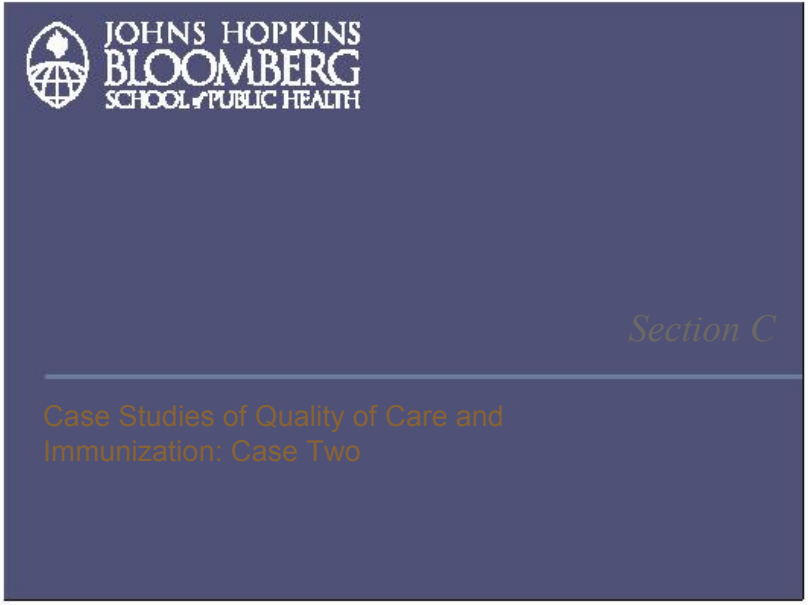

Case Two: Bamako Initiative

Knippenberg et al (1997) describe the cases of Guinea and Benin in the mid 1980s, where the Bamako Initiative strategies were refined

Quality of care was low

- People bypassed village health workers
- Schedules not respected
- Immunization not integrated with other services
- Continuity, compliance insufficient
- Little supervision, quality control
- Vaccine supply precarious

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Effectiveness

- EPI fully integrated with other PHC services, offered daily
- Staff teamwork emphasized
- Essential drugs directly distributed
- Outreach services reorganized
- Children registered in utero for vaccination
- Active tracking, channeling
- TT given during antenatal visits
- Monthly group supervision
- Semi-annual coverage monitoring sessions

The Coverage Curve

The B.I. team used an innovative graphic tool to show the nested determinants of effective coverage

Availability: inputs are there

Accessibility: people can reach the services

Utilization: people use them

Adequate coverage: compliance, timing is right

Effective coverage: the proportion of people receiving high-quality services

Continued 43

The Coverage Curve

In this example, an availability bottleneck was solved in 1992, but others remained

That year, most of the availability-access bottleneck was also solved, increasing immunization access to 91%

By 1993, active channeling and defaulter tracking reduced the high dropout rate (utilization-adequate coverage bottleneck)

An accessibility-utilization bottleneck remained to be solved

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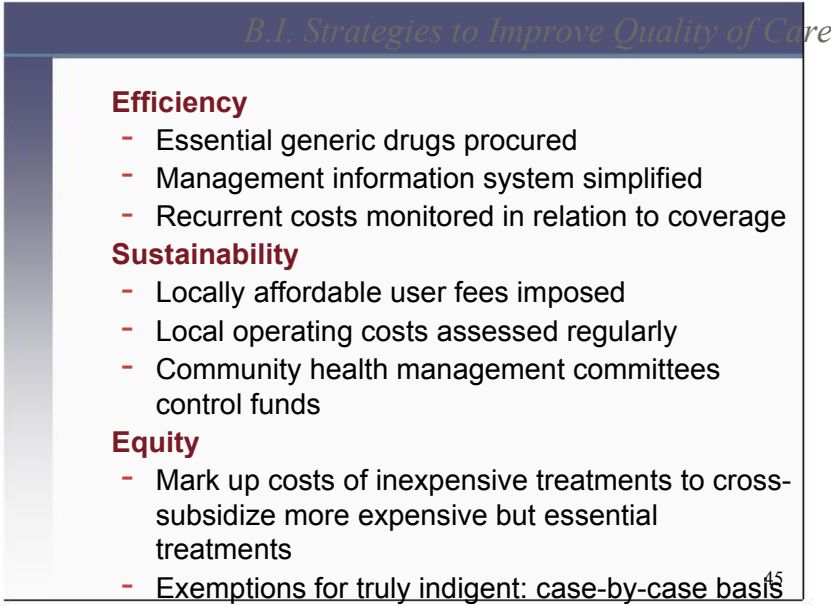

B.I. Results

Continued 46

B.I. Results

Guinea and Benin increased the percent of children under one fully immunized from 5% to 62% and 12% to 60%, respectively, over the period 19861993

Mean cost per fully immunized child: US$1012

Utilization of all PHC services increased

Overall, user fees were covering all local recurrent costs in both countries by 1993

Conclusion: people act rationally and are willing to pay more if the product is otherwise unavailable, if access becomes easier, or if quality is perceived to have improved

(Knippenberg et al 1997:Page S44)

Continued 47

B.I. Results

By 1995, over 5,000/7,000 West and Central African health centers, serving about half the population, had adopted BI strategies

Success, however, has not been not uniform

- Health centers obtain varying levels of effectiveness, efficiency
- By 1993, about one-third were still not covering their designated local recurrent costs
- The poorest 510% do not utilize the centers at all, but the remaining poor utilize them more than do the better-off

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Source: USAID,

2001, Divelbess
2000

Summary

The Donabedian and B.I. frameworks both require monitoring and feedback to assure quality

This is feasible and should be part of any routine immunization program

The B.I. strategies embody:

- Rational choice among users
- Providers, community engaged in a continuous, evidence-based quality assurance process

Both frameworks help immunization programs meet the WHO-endorsed intrinsic goals:

- Optimal health for all
- Responsiveness
- Equity

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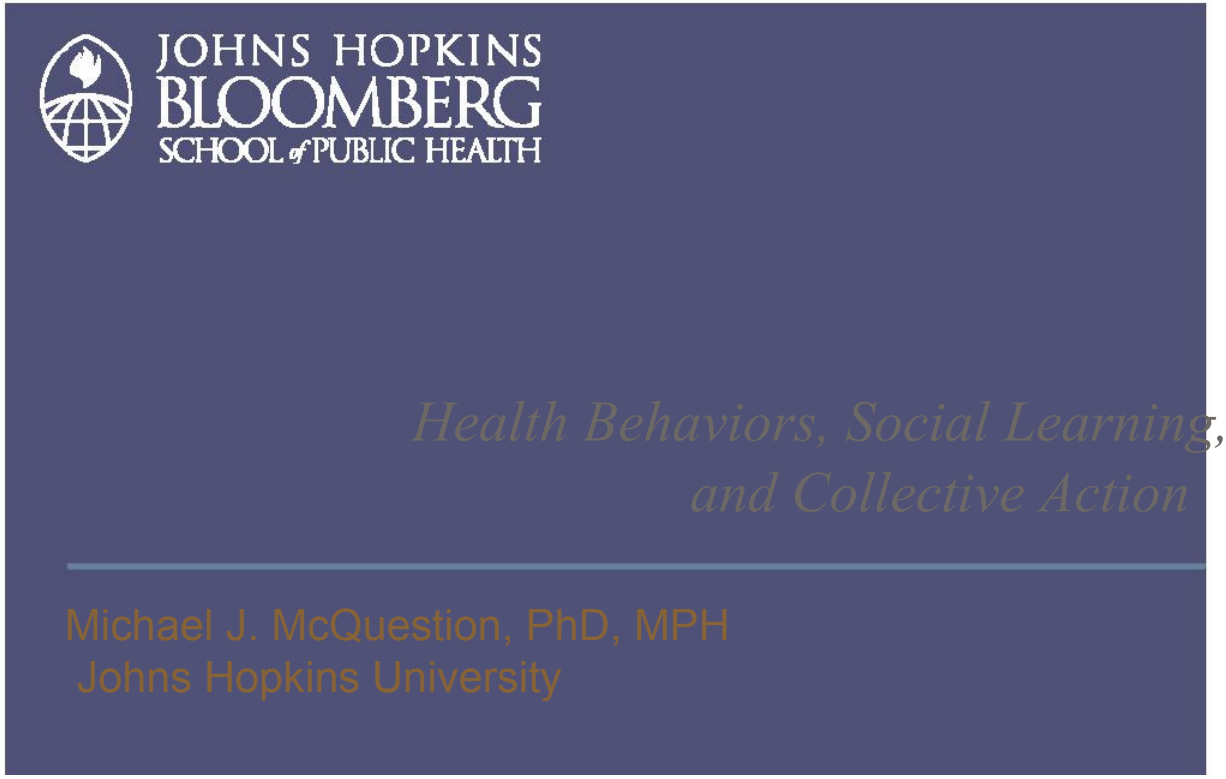
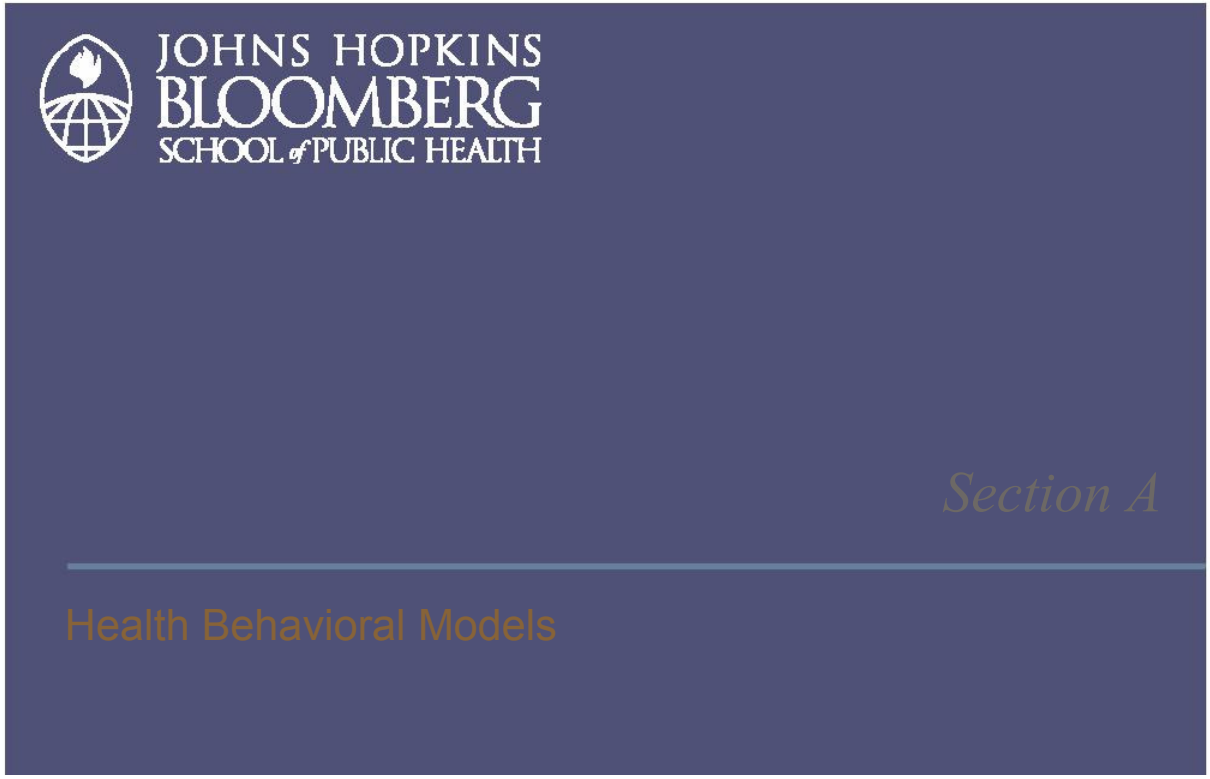

JOHNS HOPKINS
BLOOMBERG
SCHOOL of PUBLIC HEALTH
Health Behaviors, Social Learning, and Collective Action
Michael J. McQuestion, PhD, MPH
Johns Hopkins University

Objectives

After listening to, viewing, and studying the lecture materials in this course, you will be able to do the following:

- Contrast and compare three individual health behavioral models
- Understand social learning theory and its implications for immunization behaviors
- Apply the principles of collective action to improve immunization program performance

2



Immunization as Behavioral Choice

What makes someone decide to seek immunizations.

- What she knows and believes
- Her other health behaviors
- Her material resources
- Social forces

What can be done to maximize the probability of immunization choice.

4

Individual Health Behavioral Models

Many analytical models have been developed to explain individual health behaviors

In this section, we will discuss three of them:

- Health belief model
- Health behavioral model
- Household health production model

5

Health Belief Model

U.S. health researchers (Becker 1974, Rosenstock 1974) developed the *Health Belief Model* in an attempt to explain why many people do not accept preventive health services, even when easily accessible

The model incorporates four key elements:

- Perceived susceptibility to the disease
- Perceived seriousness of the disease
- Perceived benefits, barriers to taking action
- Cues that motivate action

Continued 6

Health Belief Model

Susceptibility: the individuals estimate of her probability of getting the disease

Seriousness: the individuals estimate of how bad it would be to get the disease

Benefits, barriers: the individuals estimate of how effective the preventive treatment would be and how much it will cost to get it

Cues: mass media message, conversation or other external factor that stimulates the individual to get the treatment

Continued 7

Health Belief Model

The model further assumes that the individuals social and demographic characteristics modify her perceptions and personal sense of agency

- Ascribed characteristics
- Personality, class, peer, and reference group composition

Continued 8

Example: Mexico City Campaign

Perez-Cuevas et al (1999) measured immunization behaviors among urban Mexican mothers during a mass campaign

They measured four outcomes:

- Knowledge about the campaign
- Comprehension of media and promotional messages
- Motivation to seek immunizations
- Opinions about mass media messages

Hypothesis: mothers who knew about and understood the purposes of the campaigns would most likely participate in them of their

own volition

Continued 9

Example: Mexico City Campaign

Findings

- Aware mothers were more likely to have gotten their children immunized during the campaign, on their own
- Unaware mothers who participated more likely did so due to personal invitations (cues)
- High socioeconomic status mothers were more aware but less likely to have participated in the campaign
- Aware mothers needing cues to participate were of significantly lower socioeconomic status

Continued 10

Example: Mexico City Campaign

Conclusions

- Most participating mothers (63%) responded to the mass media messages
- Awareness accounted for a 14% increase in participation, however, participation was also high among the unaware
  - Momentum effect of previous campaigns or social effects.

Comment

- This study illustrates the importance of cues and social psychological variables but it did not measure perceptions of

vulnerability, severity or
vulnerability, severity or
consequently

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Health Behavioral Model

Andersen (1968) developed this most widely used health services utilization model

It incorporates three sets of determinants:

- Predisposing characteristics
- Enabling characteristics
- Need characteristics

The determinants are sequential
predisposing -> enabling -> need -> action

Continued 12

Health Behavioral Model

Predisposing characteristics

- Demographic factors (age, sex) cause differential illness risks
- Social structural factors (education, occupation) condition lifestyles and health behaviors
- Health benefits (beliefs in treatment efficacy) affect care-seeking behavior

Continued 13

Health Behavioral Model

Enabling characteristics

- Although predisposed, an individual must be able to perform the behavior
  - Family wealth, constraints
  - Community resources

Need characteristics

- Given predisposition and ability to act, the individual must feel the need
  - Perceived (subjective assessment)
  - Evaluated (clinical diagnosis)

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Example: Inner-City Baltimore

Strobino et al (1996) used a related health behavioral model *(Protection Motivation Theory)* to examine parental attitudes and under-immunization in low-income neighborhoods of Baltimore

They interviewed mothers and caretakers and matched the responses to provider records

Continued 15

Example: Inner-City Baltimore

Findings

- Low vaccine coverage: only 54% of children were up-to-date at age 24 months
- Caretakers overwhelmingly aware, supportive of immunizations
- High sense of vulnerability, severity
- Demographic, access, social support more decisive factors in immunization compliance than health beliefs

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Comparisons

The preceding health belief and health behavior models are similar in that they:

- Emphasize psychological variables
- Treat anticipation of a negative outcome as the motivation for health behaviors
- Assume that individuals make cost-benefit calculations before acting

The next model explicitly treats immunization and other health behaviors as variables in a larger economic system

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Household Health Production

In this model (Grossman 1972), parents are assumed to produce health the way a firm produces goods or services

They operate independently and rationally

They choose their health behaviors to maximize overall household utility, given resource and time constraints

The household health production function combines information, health behaviors, food and other inputs conditional on time, resource, other constraints

Continued 19

Household Health Production

A parent is an efficient producer to the extent she maximizes outputs (healthy household members) and minimizes costs

- She chooses the correct inputs
- She optimally combines the inputs

A households derived demand for immunization or other health behaviors could increase because the cost of those behaviors fell or because their quality improved

The lower the out-of-pocket, opportunity, information, and psychic costs, the more likely parents will perform a given health behavior

A good immunization program increases household health production by lowering these costs

Continued 20

Pros and Cons of the HHP Model

Pros

- Household the primary producer
- Clear behavioral assumptions: Utility maximization, rationality
- Methodologically tractable, easy to estimate

Cons

- Assumes actors are independent
- Preferences are fixed
- Assumes all choices are based on cost-benefit calculations

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Critiques of Individual Models

Health belief, health behavioral, household health production, and other models not mentioned here all presume individuals act independently in choosing health behaviors

From an empirical viewpoint, none of these models explains much of the observed variance in health behaviors within and across groups

22

Practical Bias

Bunton et al (1991) fault these models for their practical bias: overly focused on the effects of outside intervention; tied to top-down behavioral change

They call for more emphasis on how communities themselves generate change or adapt to outside interventions

In the following sections, we consider models that incorporate social factors

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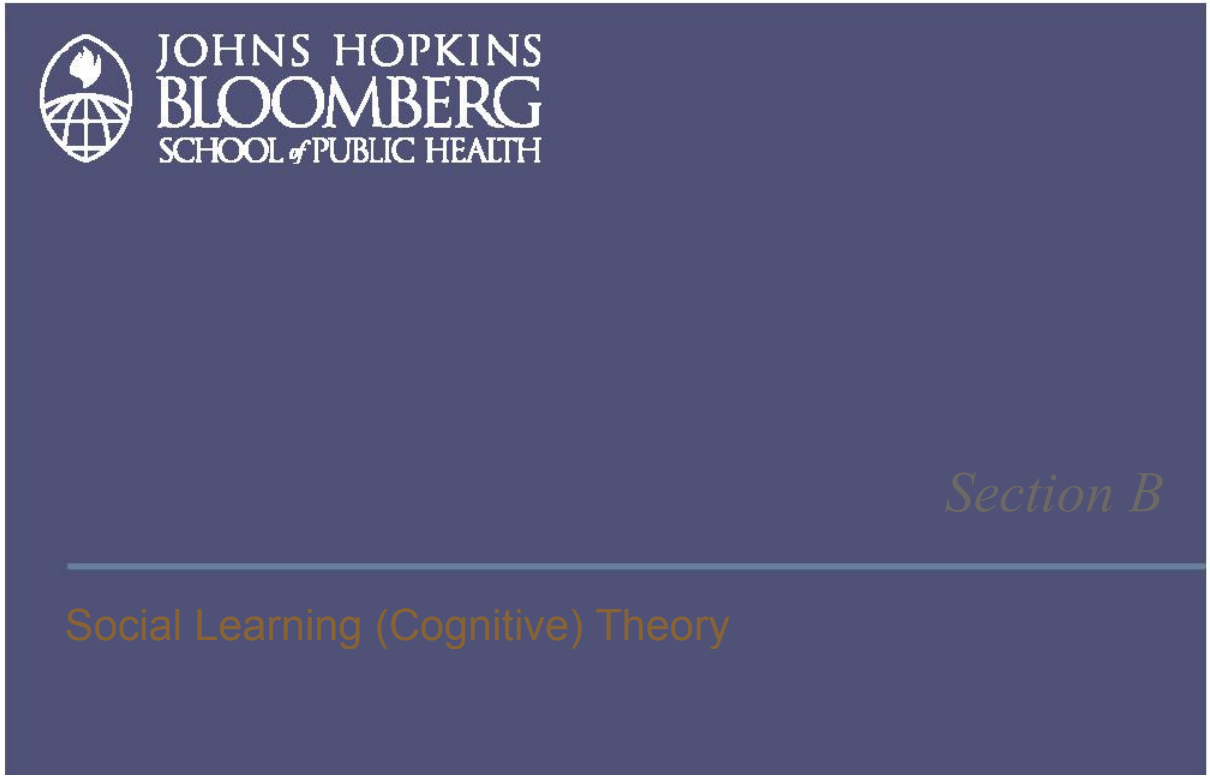

Social Learning Theory

Continued 25

Social Learning Theory

In all human behavior, there is continuous *reciprocal interaction* between cognitive, environmental, and behavioral determinants (Bandura, 1977)

People can influence their destiny, but there are limits to their self-direction

- Cognitive skills
- Physical constraints
- Available role models

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Three Key Psychological Processes of Social Learning

Vicariousness: learning by observing others and evaluating the consequences of their actions (observational learning)

Symbolism: processing and preserving experiences in representational forms (reflective thought)

Self-regulation: anticipatory thought, producing consequences for ones own actions

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Vicariousness

Allows people to acquire large, complex behavioral repertoires without having to learn them through trial and error

Main mechanism is modeling:

- The observed behaviors of individuals we most closely attend, and the consequences of their behaviors, most influence what we learn
- Largely a cognitive process

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Three Steps of Modeling

1. Observers acquire symbolic representations of the modeled behavior
   - Enduring, retrievable images
   - Verbal coding for faster retrieval
   - These memory codes serve as guides for future performances
2. Mental rehearsal allows individuals to visualize themselves performing the behavior
3. Symbolic representation is converted into action
   - Extent of behavior depends on existing skills
   - Initial errors common, practice likely needed

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Modeling and Innovation

Modeling is a creative, synthetic process

- Actors combine aspects of various models into new combinations that differ from the original sources
- Through **successive modeling,** actors serve as models for subsequent observers; behaviors change
- This diversity in modeling spawns behavioral innovations

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Modeling and Diffusion

Modeling is also a mechanism through which innovative ideas and practices diffuse within and across social structures

- **Symbolic modeling:** via mass media
- **Direct modeling:** actors observe local adopters through their interpersonal networks

Reinforcement may be needed before observers adopt the behavior

Prosocial behaviors diffuse faster than dissocial behaviors

31

Self-Regulation

Actors anticipate the consequences of their own actions

Actors may arrange environmental inducements for certain performances (the peers they choose, the places they go)

Social reactions can be positively reinforcing **(extrinsic reinforcement)**

More often, actors reward themselves for good performances **(contingent self-reward)**

- Personal standards
- A motivational function

Continued 32

Self-Regulation

This judgmental function includes

- Personal standards
- Other criteria
  - Prevailing norms (conformity)
  - Social comparisons (peers)
  - Personal comparison (to ones past performances)
  - Collective comparison (ones relative contribution to common goals)

Self-rewarded behavior is more easily maintained than externally-reinforced behavior

- It increases ones sense of

- It increases one's sense of personal agency
- May lead to a generalizable self-regulation skill

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From Self-Regulation to Socialization

Actors model both the performances of influential others and the personal standards they set

High personal standards are generally admired and often generate social rewards (vicarious reinforcement of standard-setting behavior)

Public recognition both rewards the exemplar and helps transmit the standard to others in the group

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Self-Selection Processes

Consistency in modeling favors the social transmission of standards

Actors choose reference groups whose members share similar behavioral norms

- Their self-evaluations are thus influenced by actual or anticipated reactions of members whose judgments they value

Actors will likely adhere to contingent self-reward if others in the group do the same

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Self-Regulation as Development

The principal goal of social development is to transmit general standards of conduct that could serve as guides for self-regulation of behavior in a variety of activities

Bandura 1977:138

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Reciprocal Determinism

Personal behavior determines which of many possible environmental influences come into play and how they materialize

Environmental influences call forth and shape particular behavioral repertoires

In this two-way regulatory system, both environments and behaviors constantly interact

Continued 37

Reciprocal Determinism

Examples

- A dominant individual can control a conversation
- A labor union can change the relations of production in a firm or industry
- A stimulating class can induce individual students to learn more

Implication

- Social learning processes make individual and group action recursive, emergent, auto-correlated, and endogenous to one another

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Social Learning Summarized

By explicitly relating social structure to behavioral change, social learning theory overcomes the main criticism of individual behavioral models leveled by Bunton et al (1991)

They assert that: Attitudes, values and beliefs about health are a product of social interaction[and] the context of behavioris central to any account of behavioral change. (Bunton et al 1991:156)

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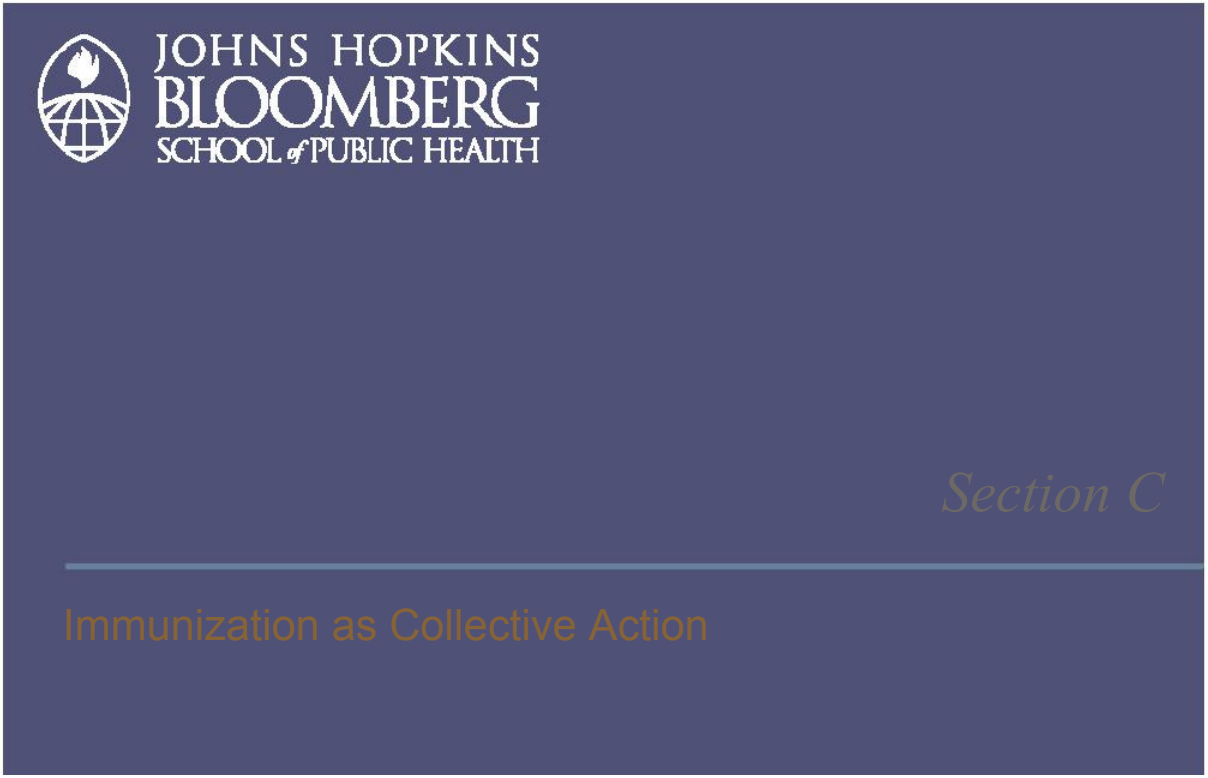
Implications for Immunization

Harnessing social learning processes to create immunization demand means working with communities, not just individuals

As social learning proceeds, conditions become increasingly favorable for shifting the immunization equilibrium (reciprocal determinism)

Provided the outcomes being modeled are favorable, the result should be higher immunization levels

40



Overview

This section describes **collective action,** a theory that seeks to explain how self-interested actors sometimes join forces to achieve a **collective good**

The theory maintains the assumption that agents act rationally to maximize individual utility

In this section, I draw heavily from the work of two economists, Mancur Olson and Samuel Popkin

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Public Good

Public (collective) good (def): The achievement of a common goal, or satisfaction of a common interest (Olson 1965)

Under certain conditions, actors in a collectivity will provide a public good through collective action

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Characteristics of a Public Good

Unattainable individually: it can only be provided collectively

Jointness of supply: available to everyone if available to anyone

Non-excludability: cannot be feasibly withheld from any group member

Provision is suboptimal unless the marginal costs and benefits are equal for every actor

If the collective good can be attained at a sufficiently low cost in relation to its benefit, such that one or more actors stand to gain by providing the good themselves, then it presumably will be

provided

Why Arent Public Goods Always Provided.

Free-rider problem: rational, self-interested actors are tempted to consume the good without contributing their fair share

Multiple objectives: heterogeneous actors may not find common cause

Conflicts of interest: some actors may have vested interests in the status quo

Incomplete information: inability to gauge the chances of success a priori

45

Other Collective Action Determinants

Size: smaller is better

- Individual contributions more noticeable
- Each individuals contribution more important

Group heterogeneity: differential interests in achieving the goal make mobilization more likely

Inequality: a few powerful actors can be exploited by more numerous weak actors

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Material Incentives

To induce participation, tangible rewards not central to the collective action may be given only to participants

- A by-product of collective action
- Must be sufficient to make defection less valuable than staying in the group
- Lends an all-or-none character to the action

47

Non-Material Incentives

Contemporary social theorists believe that non-material incentives are increasingly important, especially to urban inhabitants who are exposed to telecommunications and other aspects of globalization

Solidary: actor finds participation intrinsically rewarding

Purposive: ideology motivates participation

Expressive: actor derives benefits from expression itself

48

Immunization as Public Good

Herd immunity (def): The resistance of a group to invasion and spread of an infectious agent, based on the immunity of a high proportion of individual members of the group (Fox, 1970)

Herd immunity and its stronger cousin, eradication, are examples of public goods

They are therefore attainable through collective action

Continued 49

Immunization as Public Good

These immunization public goods can be attained if the required threshold proportion of actors participate

- Diphtheria: 70%
- Polio: 80%
- Measles: 90%

Others can free-ride and still enjoy benefits

- May face normative sanctions for doing so

50

Engineering Collective Action

In all groups, skilled leadership and/or external coordination are needed to

- Collectively identify attainable, short-term goals
- Maintain regular reporting and feedback about the collective action
  - Minimize the free-rider problem
  - Provide evidence goals are or are not being reached (efficacy)
- Arrange external quality assurance
- Publicly recognize all contributors

51

Example: Ethiopia

Bhattacharyya and Murray (2000) used a participatory approach to stimulate collective action for maternal and child health in 20 Ethiopian communities

As in the Bamako Initiative case, performance of the existing PHC system was poor

The main goal was to inculcate an ongoing dialogue between health workers and community action committees

Continued 52

Example: Ethiopia

The main strategies involved:

- Forming teams of community volunteers and local health workers to assess MCH needs and propose locally appropriate solutions
- Monitoring, evaluating, and feeding back project results to the communities

Teams could choose to implement 35 selective PHC behaviors, including immunizations

Public meetings, social mapping, and free-listing were used to induce teamwork

Structured interviews and household surveys using the lot quality assurance method

were used to
gather and interpret baseline data

Continued 53

Example: Ethiopia

Immunization levels were extremely low due to:

- Inefficient vaccination services
- Low demand due to poor access and low knowledge

Community action plans were drafted and ratified by each community

Interventions

- Intensive household health education
- Community mobilization for behavioral change
- Health worker re-training
- Integration of PHC services

One year after, follow-up surveys

One year after, follow-up surveys were performed

54

Preliminary Results

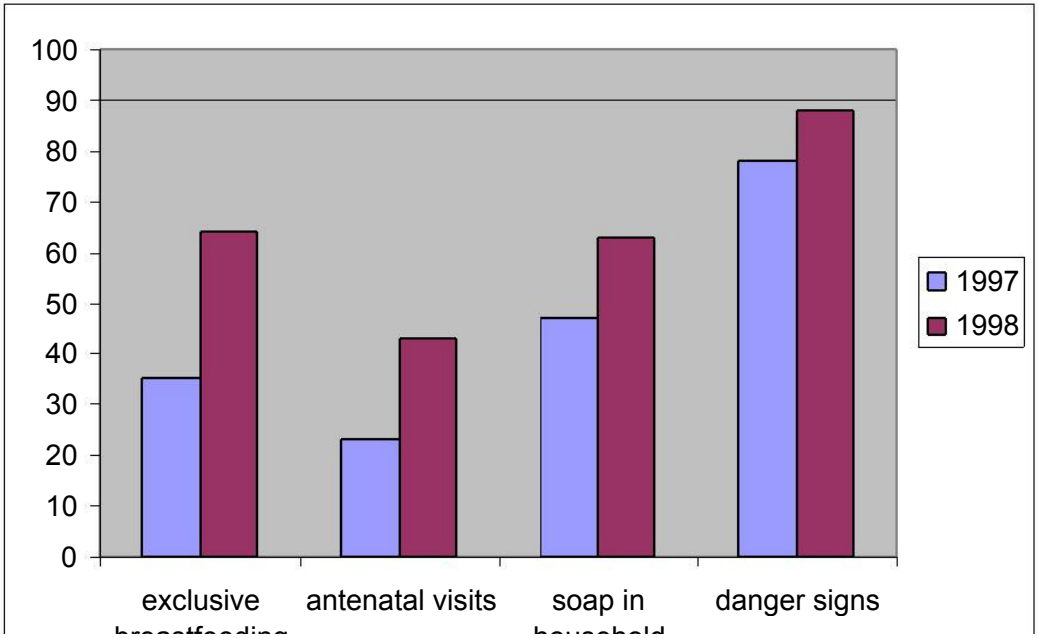
Exclusive breastfeeding, antenatal visits, and availability of soap in the household all significantly increased over the one-year period

No data on immunization were given

Monitoring and feedback by MOH and project staff were essential to inducing behavioral change

55

What We See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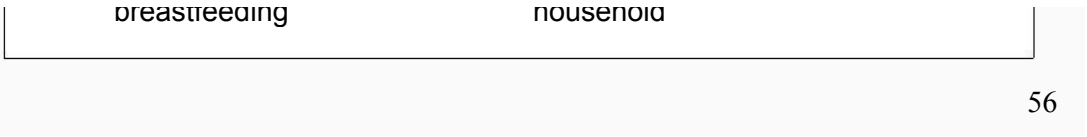

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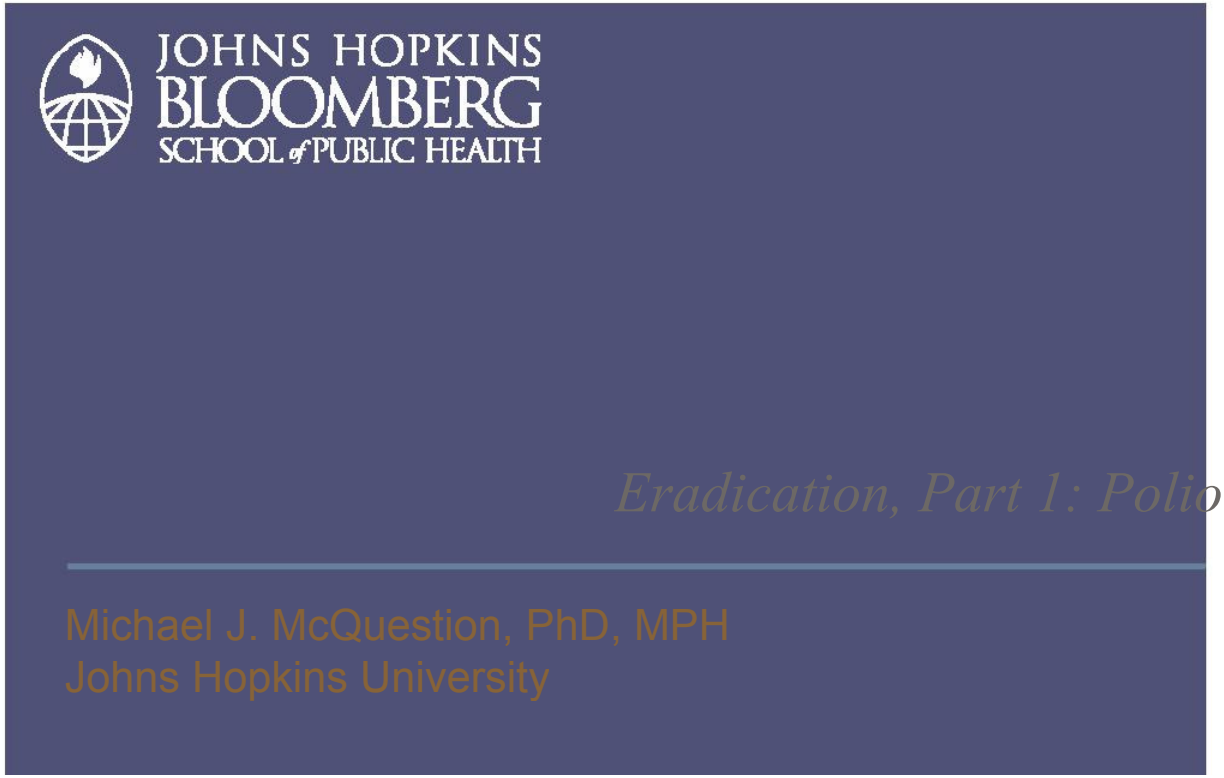
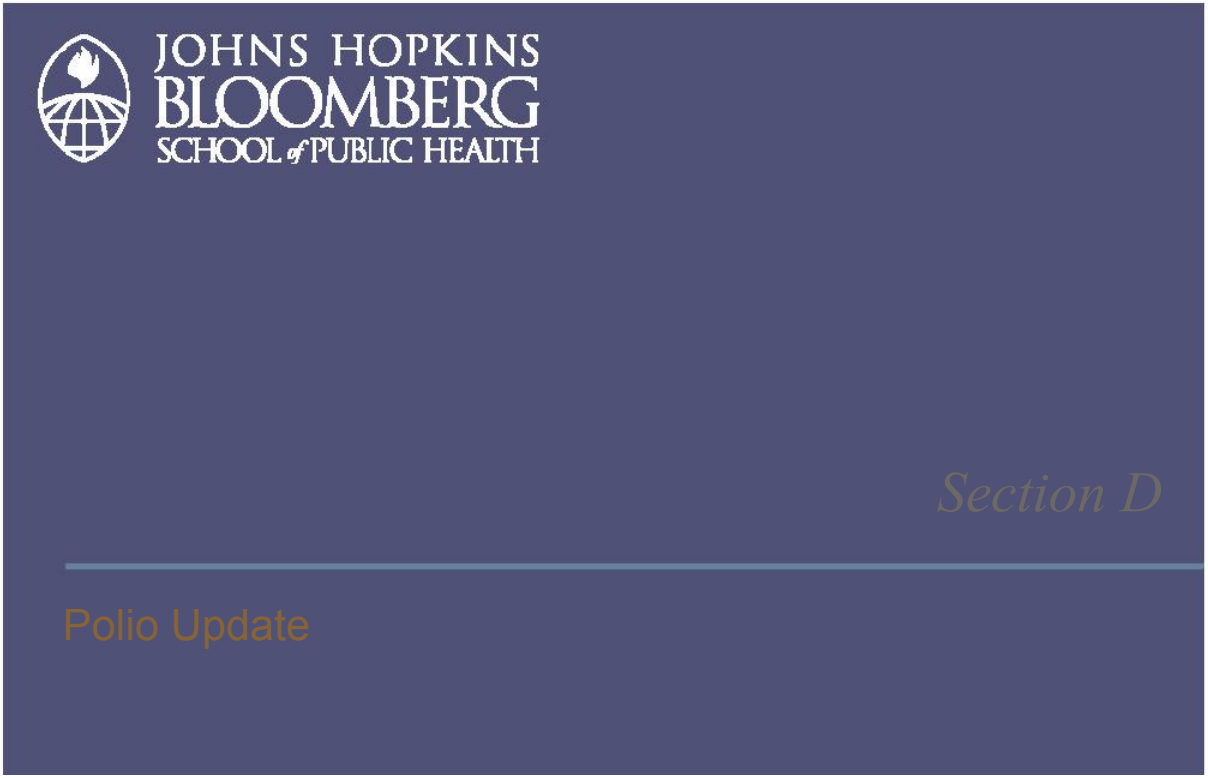
Summary

Collective action, learning and sustained

- In the long run, cognitive and social learning processes may be sufficient to attain and sustain high immunization levels
- In the short run, immunization demand can be increased through collective action
- Collective action contributes to sustained demand by accelerating cognitive and social learning processes among those who participate





Polio Progress Report

2000

- 82% of infants worldwide received three doses of oral polio vaccine (OPV)

2001 and 2002

- The figure declined to 75%

2003

- 55 countries conducted Supplementary Immunization Activities (SIAs), reaching 415 million children

Continued 3

Polio Progress Report

All countries presently and previously endemic for polio have active Acute Flaccid Paralysis (AFP) surveillance systems

Globally, the AFP rate was 1.9 per 100,000 persons ages <15 years at the end of 2003

This compares to an expected background rate of 1 per 100,000

Proportion of suspected cases with adequate stool specimens was 86%

4

Case Study: AFP Surveillance in Africa

African Region countries introduced active AFP surveillance in 1995

By 1999, 38 countries were regularly reporting AFP and other polio surveillance data to WHO

Countries adopted an Integrated Disease Surveillance and Response strategy, centralizing and coordinating core surveillance activities for polio, AFP, and other communicable diseases

Continued 5

Case Study: AFP Surveillance in Africa

Core surveillance activities

- Case detection, registration, confirmation
- Reporting, analysis, use, and feedback of data
- Epidemic preparedness and response

Other diseases included measles, neonatal tetanus, yellow fever, meningitis, cholera

6

Case Study: Findings

Nsubuga et al (2002) surveyed key informants in 32/38 participating countries to assess the integrated system

Findings

- 31/32 countries had designated AFP surveillance officers (median 10/country)
- 27/32 countries reported median annual AFP surveillance budget of $US 125,000
- 26/32 countries had at least one vehicle designated for AFP surveillance

Continued 7

Case Study: Findings

Surveillance Integration Indicators, 32 African Countries 2000		
Attribute	*n*	*(%)*
Use AFP resources for surveillance of other diseases	26	(81)
Combine detecti on of other diseases with AFP	28	(90)
Inform clinicians about ot her diseases when informing about AFP	27	(87)
Use AFP lab transport system for other diseases	14	(44)
Total	**32**	

Source: Nsubuga et al 2002

Continued 8

Case Study: Findings

Findings

- 15/32 countries had attained AFP surveillance system sensitivity above the benchmark (non-polio AFP rate=1/100,000 children aged <15 yrs)
- 11/15 adequate performing countries had added 25 other diseases to their AFP surveillance programs

Conclusion

- Integration is feasible without adversely affecting AFP surveillance

9

Polio Progress Report

At the end of 2003, there were 682 polio cases reported from six countries

- Afghanistan
- Egypt
- India (220 cases)
- Niger
- Nigeria (305 cases)
- Pakistan (99 cases)

10

Recrudescence

Rumors and resistance led to cessation of polio vaccination in Northern Nigeria in mid 2003

Result: poliovirus spread to 31/37 Nigerian states and to 12 other previously polio-free African countries

Coverage in those countries was not high enough to prevent transmission

355 new polio cases in Nigeria in 2003

Continued 11

Recrudescence

Additional cost of control activities in the 10 affected African countries: $25 million

Current goal: interrupt wild poliovirus transmission worldwide by the end of 2004

Risks

- Surveillance and house-to-house mop-up vaccination efforts will lapse
- The two remaining endemic countries (Niger, Nigeria) will not reach 90% coverage

12

Polio Progress Report

Virus-Confirmed Polio Cases

	2003	2004
Africa	446	162
Nigeria	355	133
Nigeria	41	12
East Mediterranean	113	15
Pakistan	103	12
Afghanistan	8	2
Egypt	1	1
South -East Asia	225	8
India	225	8
American	0	0
European	0	0
West Pacific	0	0

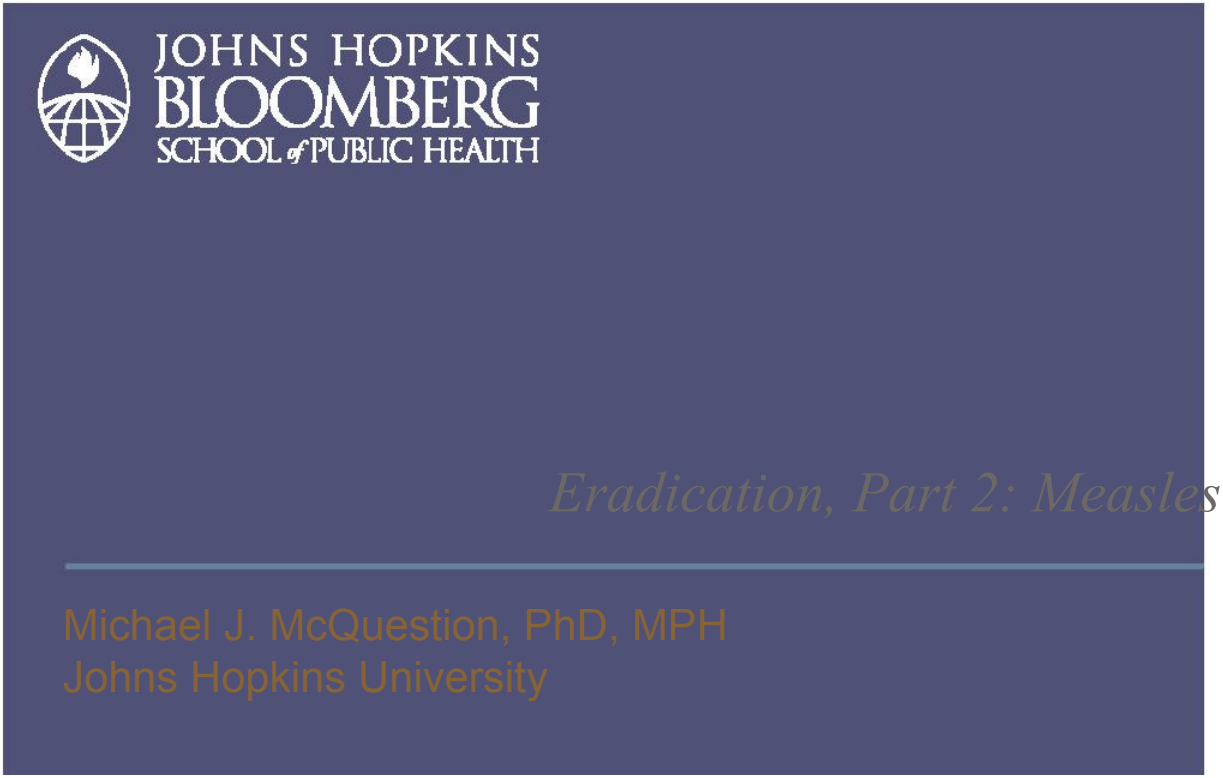
Worldwide	784	185

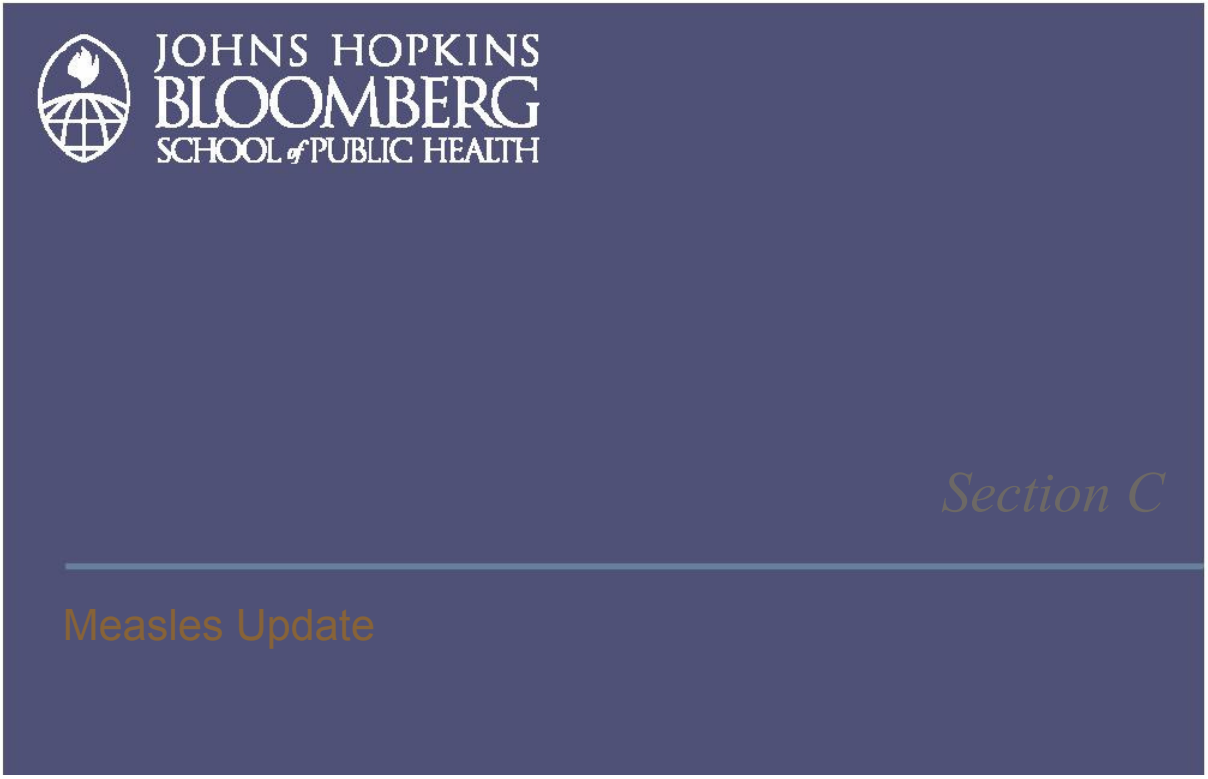
** as of May 18, 2004*

Endgame

23 Western and Central African countries will hold synchronized national immunization days in Fall, 2004, and early 2005 in a bid to end polio transmission on the continent

Once transmission is interrupted, experts will decide on the best strategy to stop the use of OPV so that no vaccine-derived polioviruses will be circulating





Measles Progress Report: Americas Region

Supplemental Immunization Activities (catch-up/ keep-up/follow-up) reached:

- 10.4 million children in 2000
- 10.6 million children in 2001
- 9.9 million children in 2002

Routine measles vaccine coverage was:

- 94% in 2000
- 96% in 2001
- 92% in 2002

Active measles surveillance indicators improved over the period

Continued 3

Measles Progress Report: Americas Region

Measles Surveillance Performance, Americas Region

Indicator	*2001*	*2002*	*2003*
Suspected cases reported	56,136	46,629	30,118
% visited within 24 hours	61	65	85
% sites reporting weekly	85	85	91
% persons with ade quate samp les	71	74	81
% labs receiving samples <= 5 days	54	58	63
% labs with results <=4 days	74	74	

Source: MMWR April 16, 2004 / 53(14): 305.

4

Virological Surveillance

As with polio, virological surveillance becomes more important as cases diminish

Two serotypes (H1, D9) were found to have transmitted in 20022003

- H1 (Mexico, U.S.) from East Asia
- D9 (Venezuela, Colombia) from Europe

In the U.S., other imported serotypes did not transmit (D4, D6, D7)

5

Measles Progress Report: Americas Region

In 2002, there were 2,584 confirmed measles cases in five countries

- Large outbreak in Venezuela due to importation from Europe, low coverage

In 2003, there were 105 confirmed measles cases in six countries

- Most cases were imported
- Only Mexico, U.S. reported transmission

6

Measles in the United States

During 20012003, there were 216 confirmed measles cases in 31 U.S. states

- 96 (44%) imported, 120 indigenous
- The 96 imported cases generated 42 chains of indigenous transmission
- Of 120 indigenous cases
  - 59 (49%) import-linked
  - 18 (15%) imported virus
  - 43 (36%) unknown source

Continued 7

Measles in the United States

Measles incidence has been less than one case per million inhabitants since 1997

Most cases are imported and are from multiple sources

Small outbreaks with limited transmission occurs, but immunity levels are high enough to prevent endemic transmission

8

Goal May Be Achieved

There has been no indigenous measles transmission for two years or more in 38/47 AMRO countries and territories

Importations will continue as long as measles persists in other regions

If countries follow the PAHO strategies, imported cases will not transmit

The goal of regional measles elimination may have been achieved

9

Global Measles Situation

Range of regional coverage levels

- AMRO, EURO, WPRO: 8294%
- EMRO: 6773%
- SEARO: 5072%
- AFRO: 5160%

Since 2000, WHO/UNICEF have been recommending two opportunities for children to receive a first dose of measles vaccine (second opportunity schedule)

- Either through routine EPI
- Or through periodic campaigns

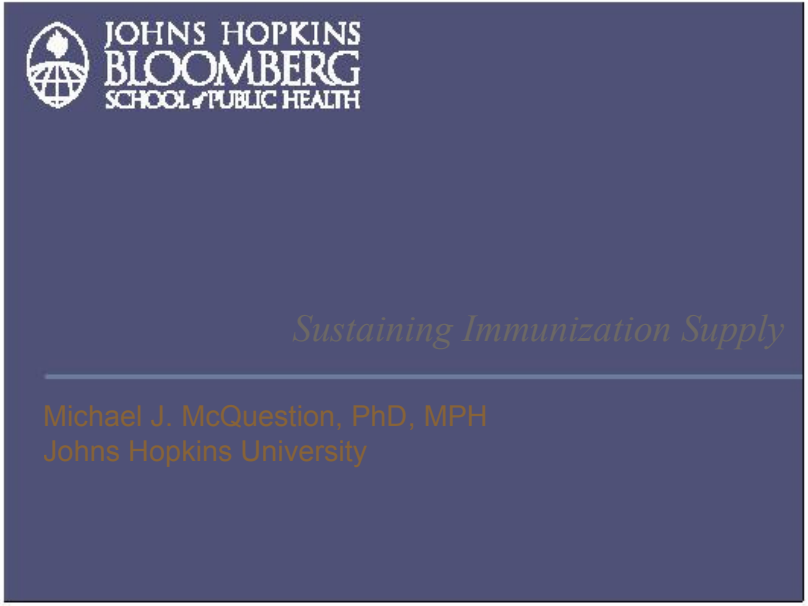
Continued 10

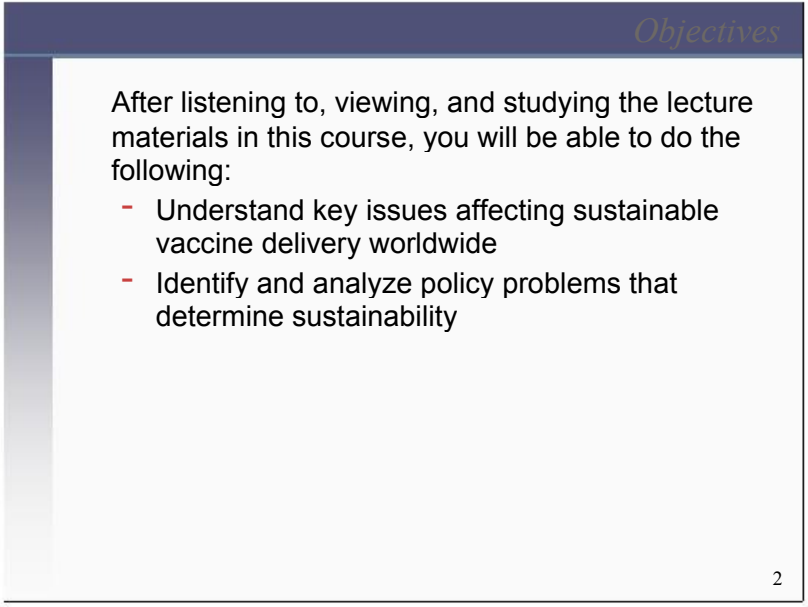
Global Measles Situation

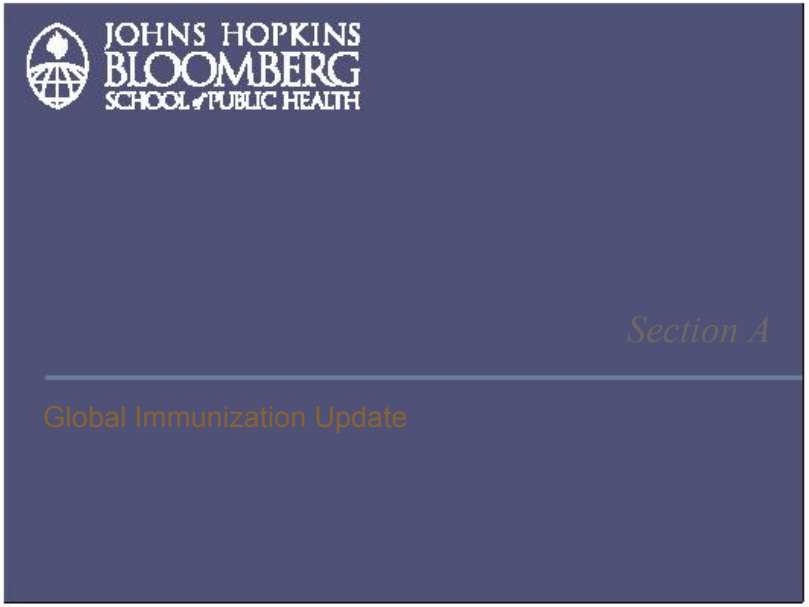
During 19972001, 156/191 (82%) of WHO Member Countries provided second opportunities through Supplementary Immunization Activities

Conclusion

- Other regions still have a long way to go before global measles eradication can be undertaken







Global Inequality

By 1997, 8095% of children in the U.S. and other **developed countries** were being fully immunized against up to 12 vaccine-preventable diseases

The incidence of those diseases in the developed world is now virtually nil

In 1990, the **developing world** reached a high-water mark: around 80% of children were immunized against the six core EPI target diseases (UCI 1990)

Since then, vaccine coverage has dropped in many countries

Developing countries still suffer 3 million cases of vaccine-preventable diseases annually

Gap between rich/poor continues to grow

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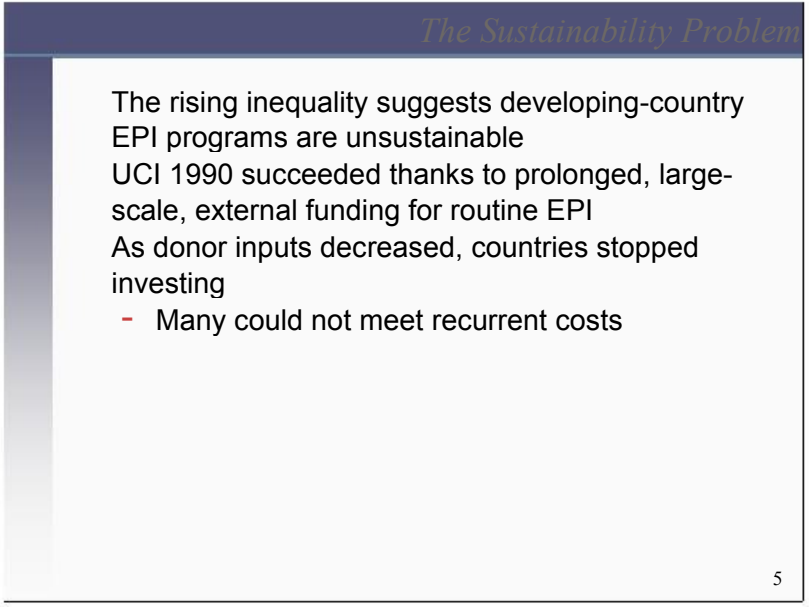

Sustainability and Eradication

The countries continue to receive sizable inputs to eradicate polio, measlesbut this will not solve the sustainability problem

Eradication follows different logics

- Economic: intrinsically cost-beneficial
- Pragmatic: not necessarily dependent on routine program performance
- Political: polities readily organize, support, participate

In what ways can the polio eradication investments strengthen routine EPI.

A high-level WHO official identified these specific areas:

Continued 6

The Sustainability Problem

Polio will probably be eradicated in the next few years

New vaccines, perhaps other eradication efforts may induce more external inputs

However, long-run, large-scale external funding for EPI programs is not assured

Conclusion

- Countries must eventually assume their own immunization costs

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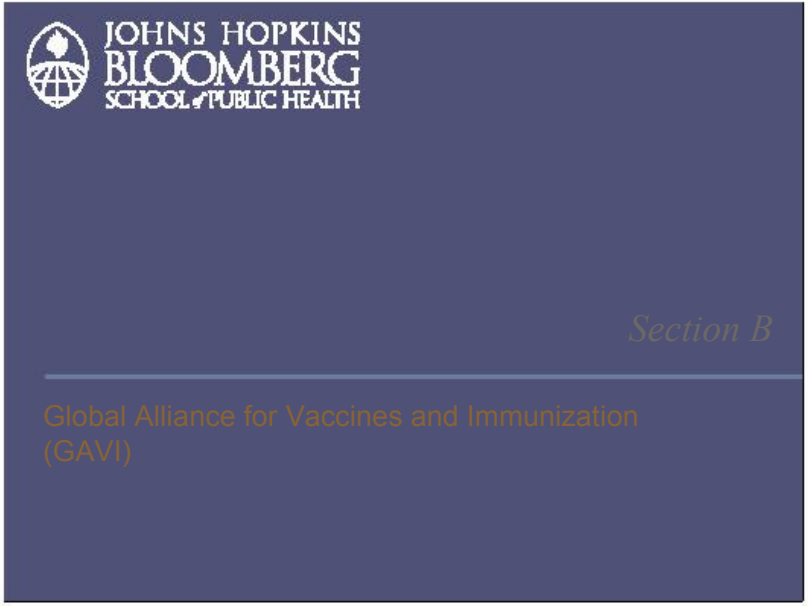

GAVI

An important new actor for global immunization is The Global Alliance for Vaccines and Immunization (GAVI)

GAVI consists of counterpart staff from WHO, UNICEF, the World Bank, the Gates Foundation, other non-governmental organizations, and vaccine manufacturers

The Vaccine Fund receives and disburses donor funds to meet GAVIs goals

Continued 9

GAVI

Fast track: GAVI began in 2000

Donors matched an initial US $750 million grant from the Bill and Melinda Gates Foundation, bringing total Vaccine Fund commitments to US $1.3 billion by 2004

GAVI targets the worlds 75 poorest countries

As of July, 2004, GAVI had committed US $1.08 billion to 70 of them in the form of five-year grants

As of 2004, GAVI had spent US $236 million, saving over 500,000 lives

Any way you look at it the results are fantastic. Best investment I ever made. (Bill Gates)

10

Eligibility Criteria

Annual per capita GNP less than U.S. $1,000
Functioning Interagency Coordinating Committee
Recent EPI program assessment
Multi-year plan incorporating assessment recommendations
A strategy to improve, maintain injection safety

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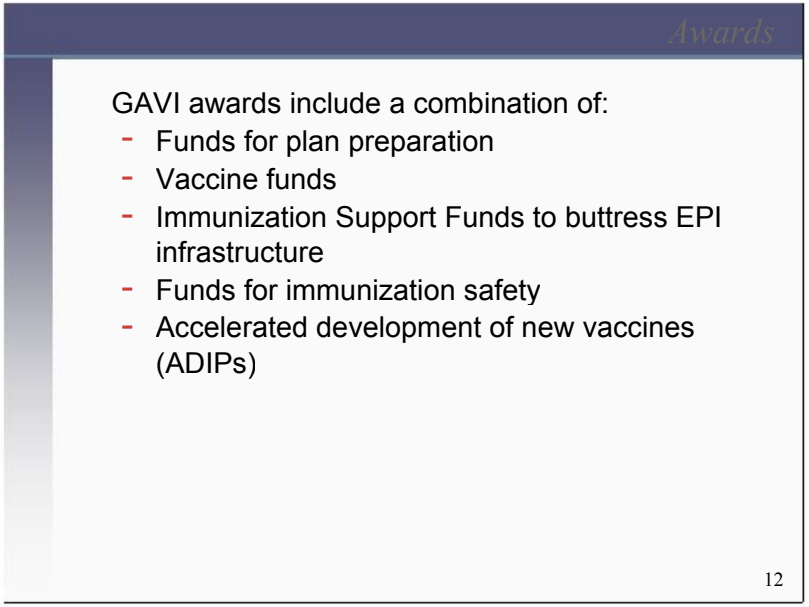


GAVI in Africa
13

Case Study: GAVI in Africa

Brugha et al (2002) analyzed the initial experiences of GAVI grantees Ghana, Mozambique, Tanzania, and Lesotho

The GAVI inputs included:

- Stronger donor coordination
- Introduction of hepatitis B vaccine and new safe injection equipment
- Additional operational funding

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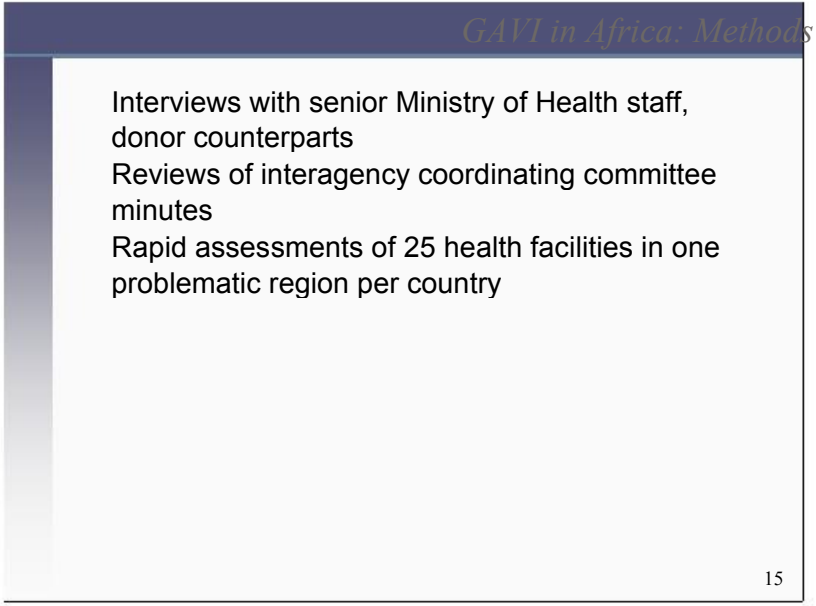

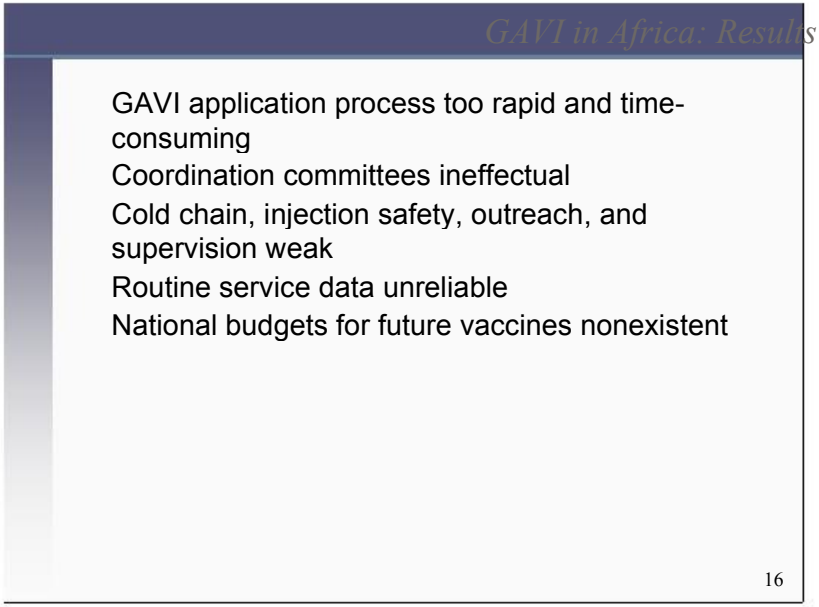

GAVI in Africa: Positive Results

GAVI inputs rapidly reached the countries

Auto-destruct syringes and other innovative equipment were introduced

Meeting GAVIs expectations made managers realize routine EPI functions were under-resourced

Recommendations

- District, provincial, hospital managers, other senior staff must participate in planning for GAVI support
- Many more resources needed to buttress EPI delivery systems before GAVI vaccine procurement support can have impacts
- Start activities on a pilot basis

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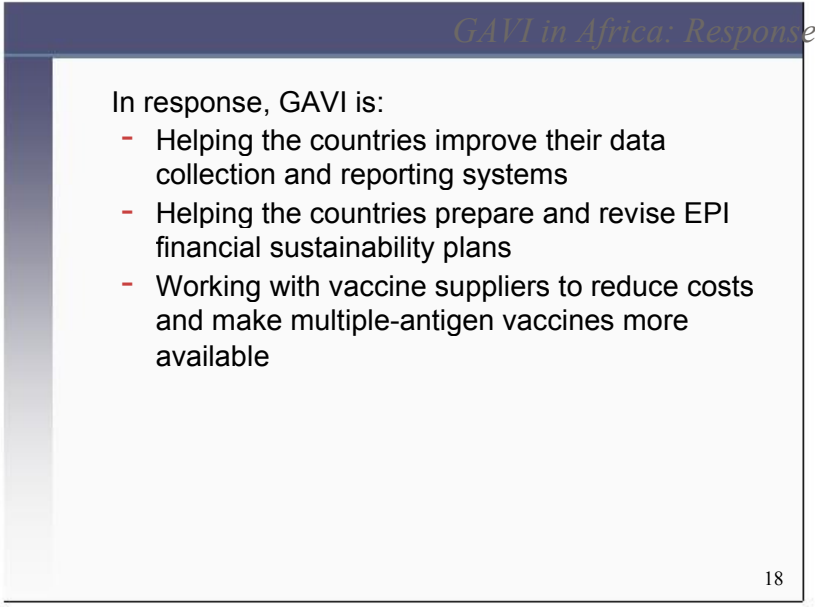

Innovations

Awards tied to performance

- Countries are expected to show increased DPT3 coverage within three years in order to remain eligible for more funding

Exit strategy

- After five years, countries are expected to find alternative funding sources

Technical inputs

- Data Quality Assessments (DQAs), Financial Sustainability Plans (FSPs)

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Data Quality Audits

Each grantee country must perform at least one DQA

- 2001: 6 performed, 1 country passed
- 2002: 15 performed, 8 passed
- 2003: 8 more passed
- 2004: 16 new, 5 second-round DQAs planned

Reported data are compared, validated from local to national level

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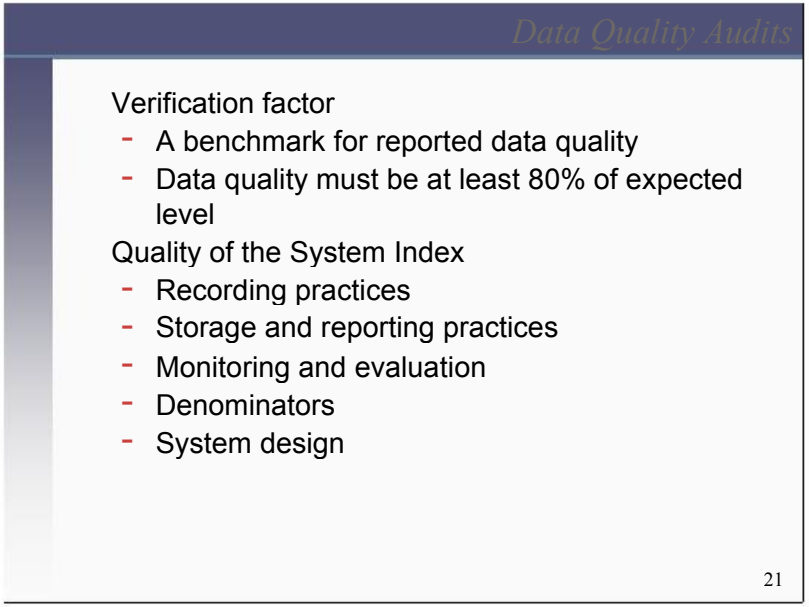

DQA Example: Afghanistan 2003

QSI of Provinces and of their Health Units

Provinces	*Health Units*			
	QSI (%)	*Average QSI (%)*	*Lowest QSI (%)*	*Highest QSI (%)*
Ka b u l	79.4	55.7	46.4	60.7
Ghazni	66.7	58.9	46.4	71.4
Hera t	67.6	68.5	46.4	85.7
Bagh lan	31.6	58.9	28.6	82.1
Averag e QSI	61.3	60.5	28.6	85.7

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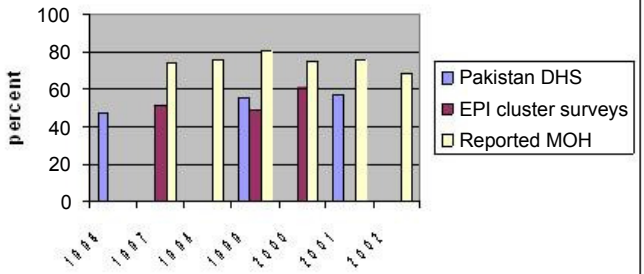
DQA Example: Pakistan 2003

Percent children 12-23m fully immunized, by year and data source, Pakistan (Source: GAVI 2003)



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GAVI Inputs

Financial sustainability plans
- 12 countries in 2002
- 16 countries in 2003
- 43 countries total by mid-2004

Host governments, donor agencies jointly analyze EPI costs, program strategies

Costs are projected for coming five years

Sources of funding, funding gaps are identified

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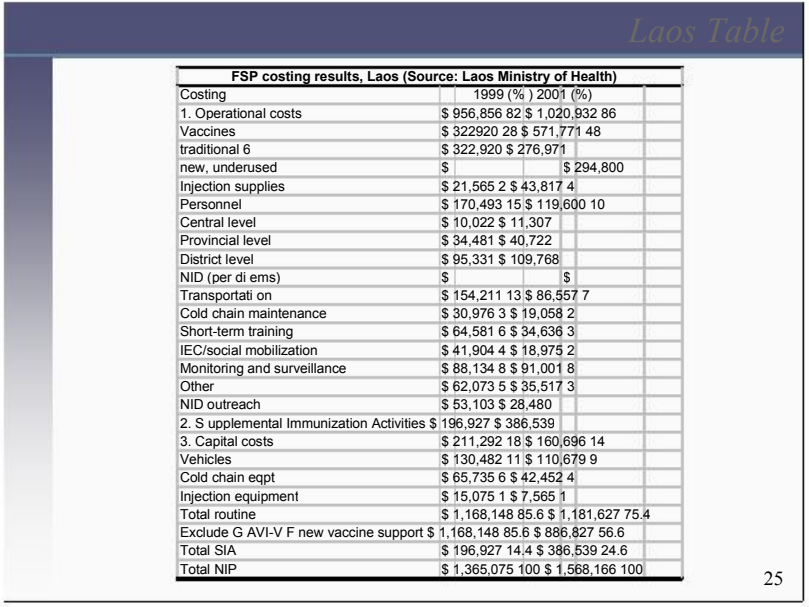
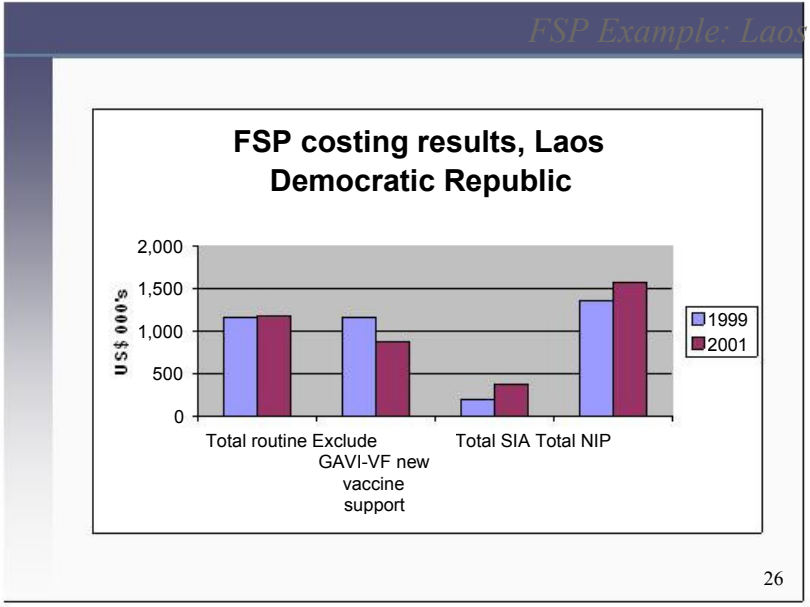
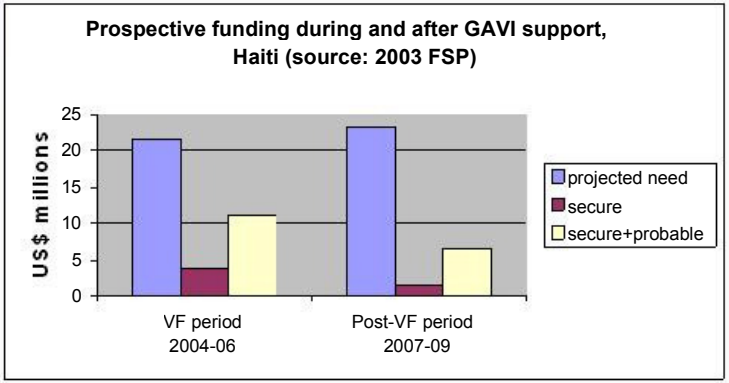


FSP costing results, Laos (Source: Laos Ministry of Health)

Costing	1999 (%)	2001 (%)
1. Operational costs	$ 956,856 82	$ 1,020,932 86
Vaccines	$ 322920 28	$ 571,771 48
traditional 6	$ 322,920	$ 276,971
new, underused	$	$ 294,800
Injection supplies	$ 21,565 2	$ 43,817 4
Personnel	$ 170,493 15	$ 119,600 10
Central level	$ 10,022	$ 11,307
Provincial level	$ 34,481	$ 40,722
District level	$ 95,331	$ 109,768
NID (per di ems)	$	$
Transportati on	$ 154,211 13	$ 86,557 7
Cold chain maintenance	$ 30,976 3	$ 19,058 2
Short-term training	$ 64,581 6	$ 34,636 3
IEC/social mobilization	$ 41,904 4	$ 18,975 2
Monitoring and surveillance	$ 88,134 8	$ 91,001 8
Other	$ 62,073 5	$ 35,517 3
NID outreach	$ 53,103	$ 28,480
2. S upplemental Immunization Activities	$ 196,927	$ 386,539
3. Capital costs	$ 211,292 18	$ 160,696 14
Vehicles	$ 130,482 11	$ 110,679 9
Cold chain eqpt	$ 65,735 6	$ 42,452 4
Injection equipment	$ 15,075 1	$ 7,565 1
Total routine	$ 1,168,148 85.6	$ 1,181,627 75.4
Exclude G AVI-V F new vaccine support	$ 1,168,148 85.6	$ 886,827 56.6
Total SIA	$ 196,927 14.4	$ 386,539 24.6
Total NIP	$ 1,365,075 100	$ 1,568,166 100



FSP Example: Haiti



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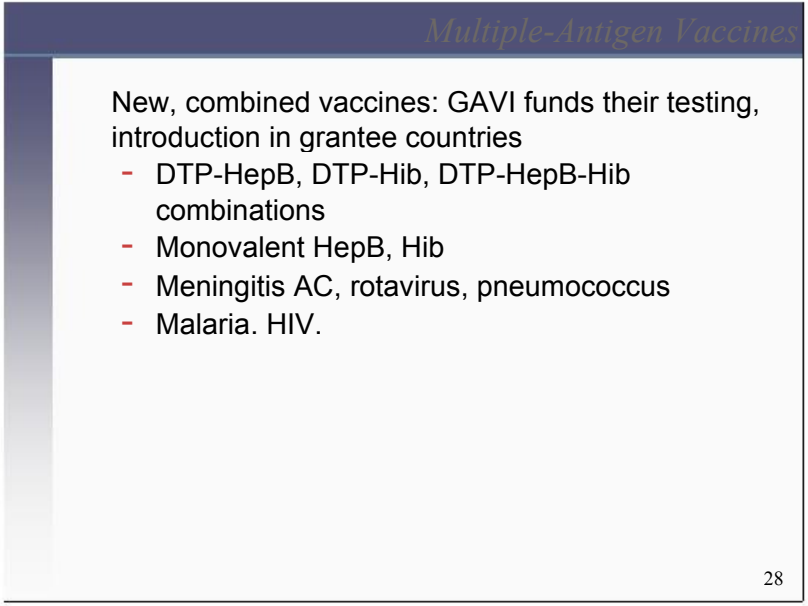

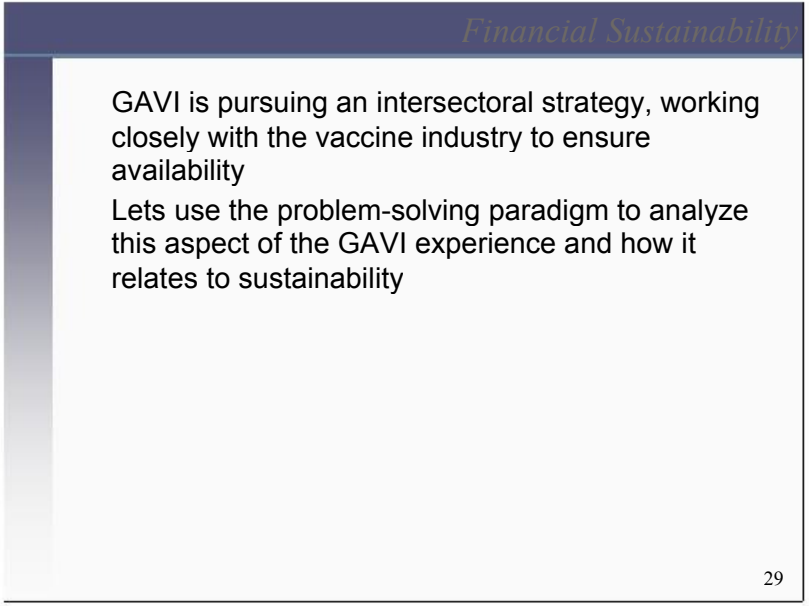

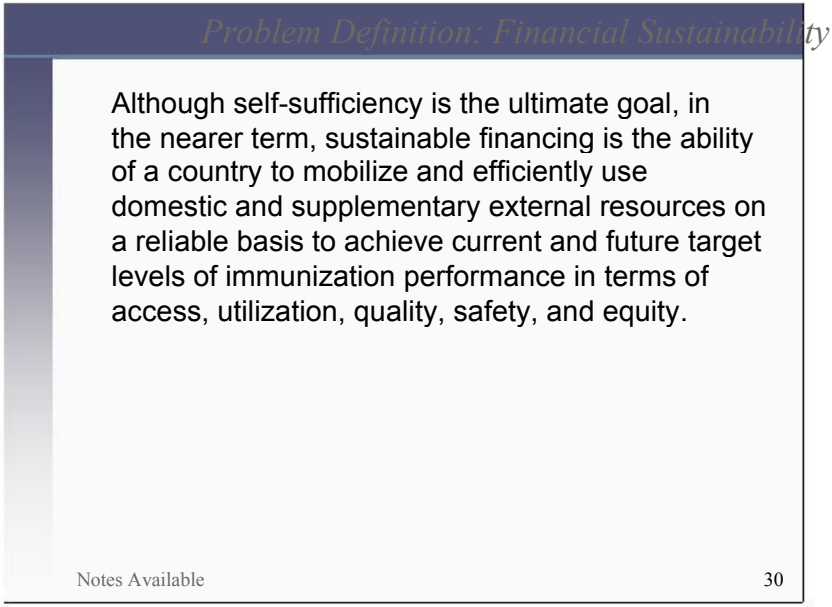

Source: GAVI

Financial Task Force,
1999

Magnitude of the Global Marketing Problem

A recent report to the GAVI Board (Mercer Management Consulting 2002) showed:

- The global vaccine market grew from U.S. $2.9 billion in 1992 to $6 billion in 2000
- Industrialized countries represent 82% of revenue, 12% of volume
- The five largest manufacturers spent an estimated $750 million on research and development in 1992

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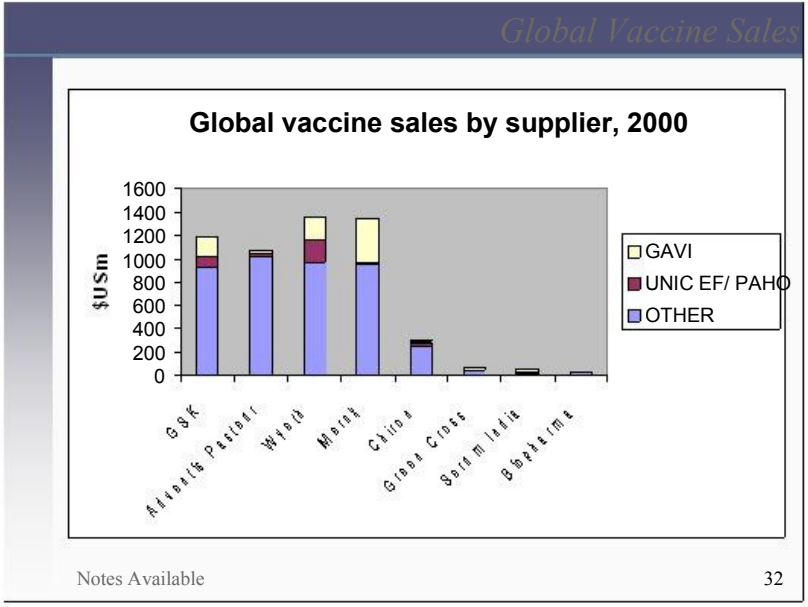

Source:

Mercer Consulting, 2002

Conceptualize Determinants

For multinational firms, vaccine profitability has risen since 1992, driven by proprietary products and technology substitution in high-income markets

As industrialized countries vaccine schedules diverge from those of developing countries, there are fewer opportunities to offset vaccine costs for the latter by charging higher prices in the former (tiered pricing)

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Vaccine Market Segments and Profits

Vaccine Market Segments and Profits (2000)			
Basic Pediatrics	*Enhanced Pediatrics*	*Proprietary Pediatrics*	*Adult / Travel*
OPV IPV		Pneumonococcal, meningococcal conju gates	Hepatitis A
BCG DTaP	Varicella		Yellow fever
TT	Hepatitis B		Typhoid
DTP	Hib		Influenza
Measles MMR			
US$680m	**$2.0b**	**$1.7b**	**$1.7b**

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Strategy A: Develop LDC Vaccine Suppliers

In the past decade, more developing-country firms have become vaccine producers

These emerging suppliers can produce basic vaccines more cheaply than the multinationals

However, only the multinationals can profitably produce the newer vaccines

Developing countries need both sources

35

Strategy B: Develop the New Vaccine Market

Developing countries are important to the emerging producers but have little leverage with the multinational producers

Recommended GAVI procurement strategies:

- Assure appropriate returns to suppliers
- Create credible, predictable demand
- Work closely and openly with multinational producers

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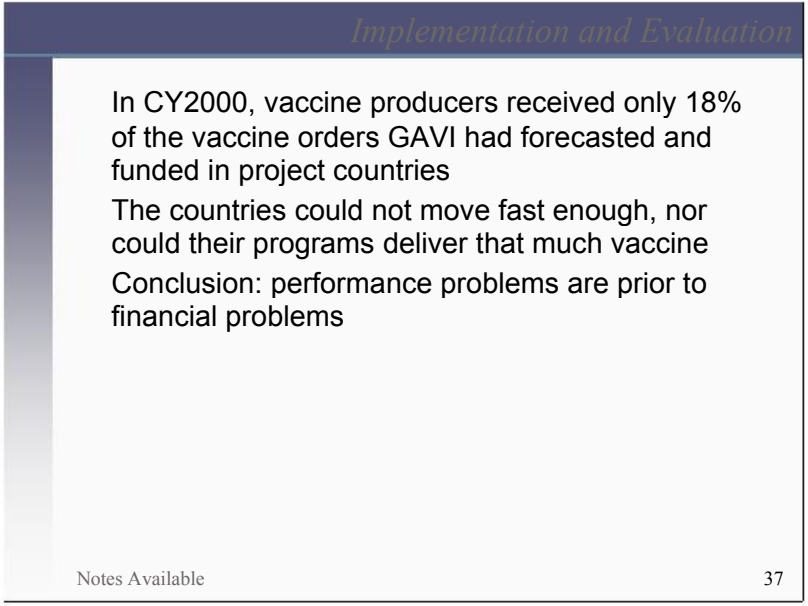
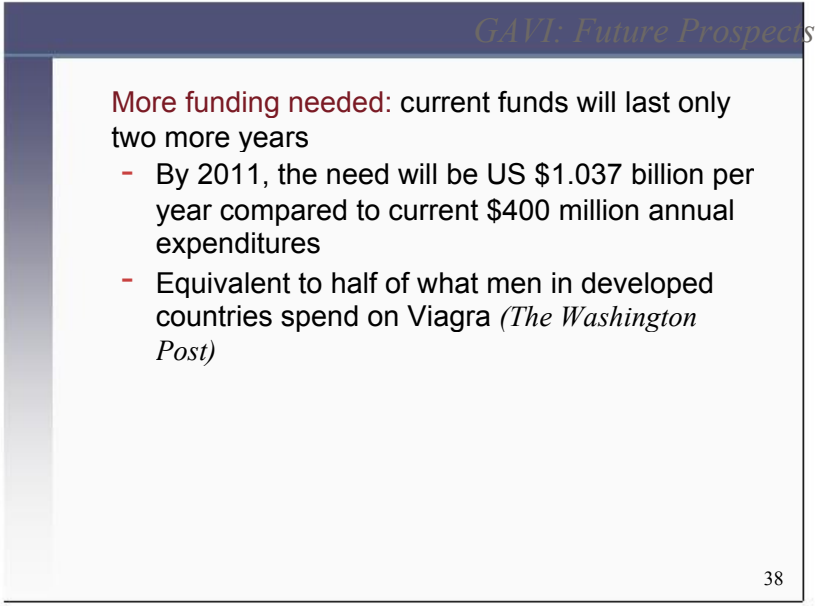
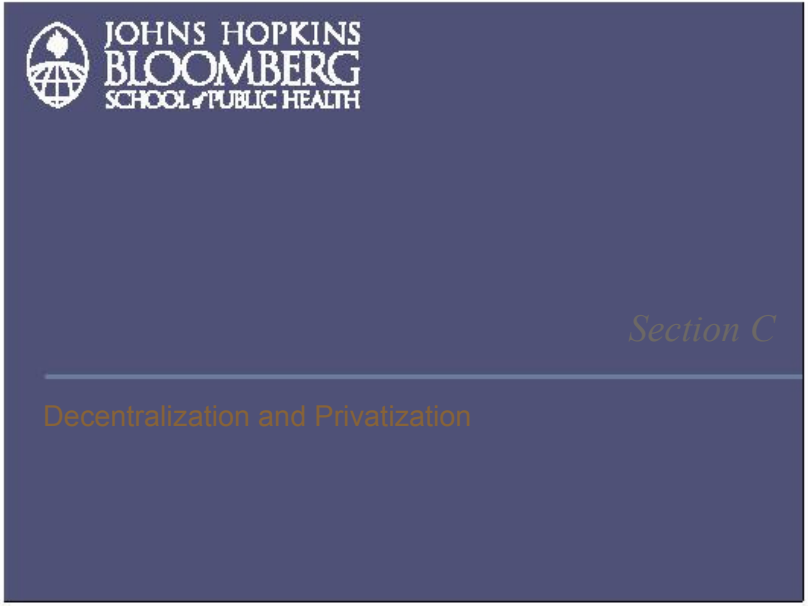


Source:

Mercer Consulting, 2002





Decentralization and Privatization

While GAVI addresses financial sustainability, many EPI programs must adjust to structural health sector reforms

- Decentralization
  - Move decision making over public goods from central to peripheral levels
- Privatization
  - Permit NGOs, commercial providers to offer immunization (economic liberalization)

40

Structural Adjustment

In heavily indebted poor countries, immunization and other health programs have been decentralized over the past two decades as part of structural adjustment policies

Continued 41

Decentralization

A more generalized decentralization trend has affected most developing countries over the past two decades

Countries are shifting both the authority to raise revenues and the responsibility for delivering services to lower governance levels

With decentralization comes market liberalization

- Private sector providers are encouraged to give immunizations, too

Continued

Decentralization

As decentralization progressed during the 1990s, vaccine coverage fell in many countries

Some of the coverage losses were due to reduced donor inputs and the failure of national governments to provide adequate funding

Another component was technical

- Most districts did not have enough adequately trained managers or the administrative agility to deliver immunization programs on their own

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Implications of Decentralization for Immunization

Azfar et al (2000) identify three rationales for decentralization

- Improve allocative efficiency by increasing demand-responsiveness of public goods and services
- Increase accountability, cut corruption
- Promote cost-recovery

Continued 44

Implications of Decentralization for Immunization

They compared immunization performance following decentralization in the Philippines and Uganda

Among their conclusions:

- Despite decentralization, hierarchy remains and there is little local input
- Local information on program performance is scarce, enabling local elites to divert resources for other uses

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Case Study: Bogot

Gallardo et al (2002) studied immunization performance in Bogot, Colombia, following structural reform

Colombias EPI and other public health services were decentralized and privatized in 199093

Vaccine coverage dropped in Bogot over the 19972000 period

The authors analyzed why this happened

46

Bogot: Decentralization Plan

Colombias decentralization plan included:

- Vaccine purchased with national funds, delivery costs paid with local resources
- Universal insurance through private insurers with immunizations mandatory
- Immunization delivered through:
  - Private providers (for those with contributory or subsidized insurance)
  - Government clinics (for the uninsured)

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Bogot: Private Providers and Public Hospitals

Private providers
- Competed for patients
- Received capitated payments that included immunization fees

Public hospitals
- Reimbursed for immunizations from departmental and municipal sources
- Could not immunize insured individuals

Bogot
- 72% insured
- 28% uninsured

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Bogot: Falling Coverage Levels

Responding to the falling coverage levels:

- Central MOH was unable to compel private providers or public hospitals to implement demand-generating efforts
- It could only implement remedial vaccination days through public clinics
- Coverage failed to increase

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Bogot: Attribution of Failure

The authors attributed the failure to:

- Vaccine shortages due to delays in central vaccine procurement caused by an economic crisis
- Divided responsibilities, uncoordinated administrative procedures across private and public sectors
- Reduced immunization access as providers cut sites to minimize costs

50

Global Decentralization Effects

Khaleghian (2004) studied the effects of decentralization on immunization coverage in 140 lower- and middle-income developing countries from 1980 to 1997

He used DPT3 and measles vaccine coverage data from the WHO/UNICEF joint reporting system

Decentralization was indicated by whether states, provinces, or municipalities had taxing, spending, and regulatory authority

His time-series model controlled for other factors, including GNP, degree of democratization, ethnicity, and external EPI donor involvement

Continued 51

Global Decentralization Effects

Findings

- In low-income countries, decentralization was associated with higher coverage levels
- In middle-income countries, decentralization was associated with lower coverage levels
- The cut-point is at about US $1400 GNP per capita

In poor countries, the decentralization effect on immunization coverage was equivalent to a 20% increase in literacy levels

In middle-income countries, decentralization had the effect of a 15% decrease in literacy

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Policy Questions

These results raise difficult conceptual issues about immunization sustainability

- If an immunized population is a public good, what incentives are there for the private sector to help provide it.
- Without budgetary and legal authority, how can a ministry of health ensure that peripheral health actors follow norms, report, and coordinate efforts.

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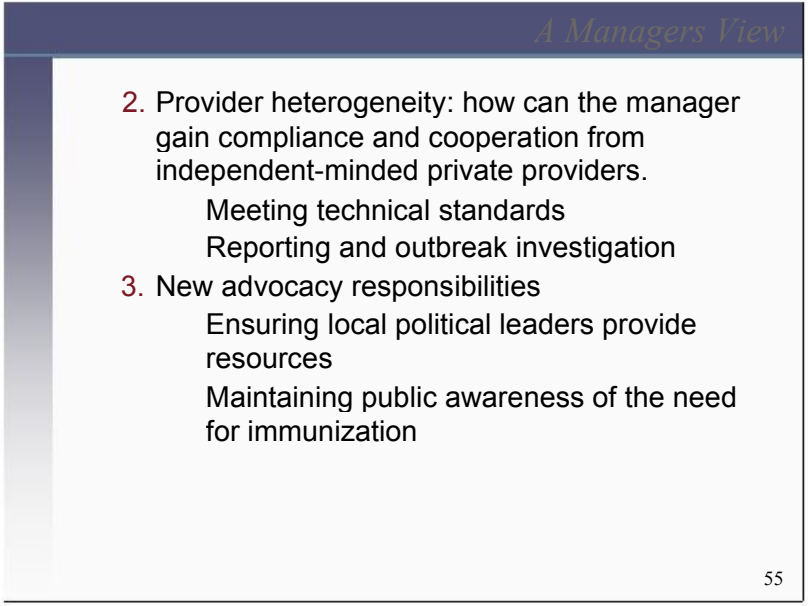
A Managers View

A district-level EPI manager facing decentralization will probably have to deal with several kinds of problems

1. A new principal-agent problem: the manager is now the agent, the communities are the principals

   Before decentralization, the district manager was the agent of the national EPI manager

Continued 54



Public Awareness

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A Managers View

A national EPI manager also faces new roles and responsibilities

- Ensuring that all districts perform and that none free ride (i.e., fail to maintain high vaccine coverage and strong surveillance systems)
- Providing ever higher quality feedback to peripheral actors
- Ensuring that public and private providers have adequate performance incentives

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Conclusions

There is no alternative to building public sector capacity for delivering immunization programs

With decentralization, many more bureaucratic, political, and community actors require technical inputs

A strong national immunization program is still needed

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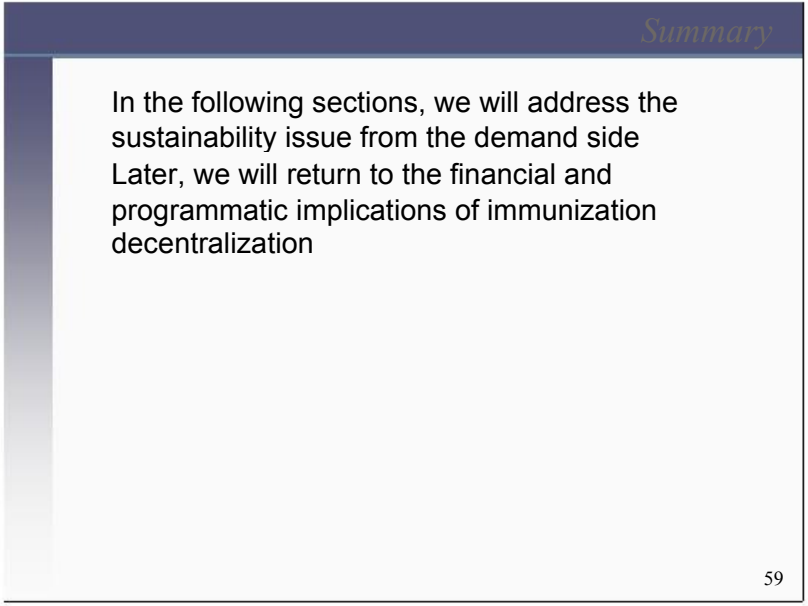

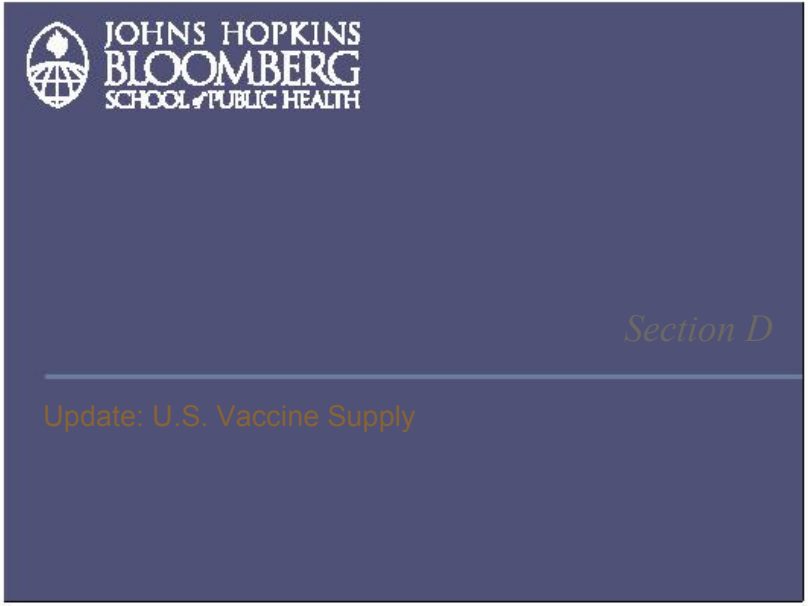

U.S. Immunization Situation

The U.S. has maintained childhood vaccine coverage levels over 75% since the early 1990s
Indigenous transmission of the vaccine-preventable childhood diseases eliminated
Influenza still kills over 20,000 Americans yearly, mainly adults over 65
Lets trace the evolution of the U.S. immunization program

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U.S. Immunization Milestones: 19551962

1955

- Federal government helps states buy inactivated polio vaccine (IPV)

1960

- One-time bulk purchase of an OPV stockpile for states to stop polio epidemics

1962: Vaccination Assistance Act (Section 317 of the Public Health Service Act)

- Aimed to equalize vaccine coverage
- Provided technical support (surveillance, management) to states
- Federal government negotiated vaccine prices

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U.S. Immunization Milestones: 19651986

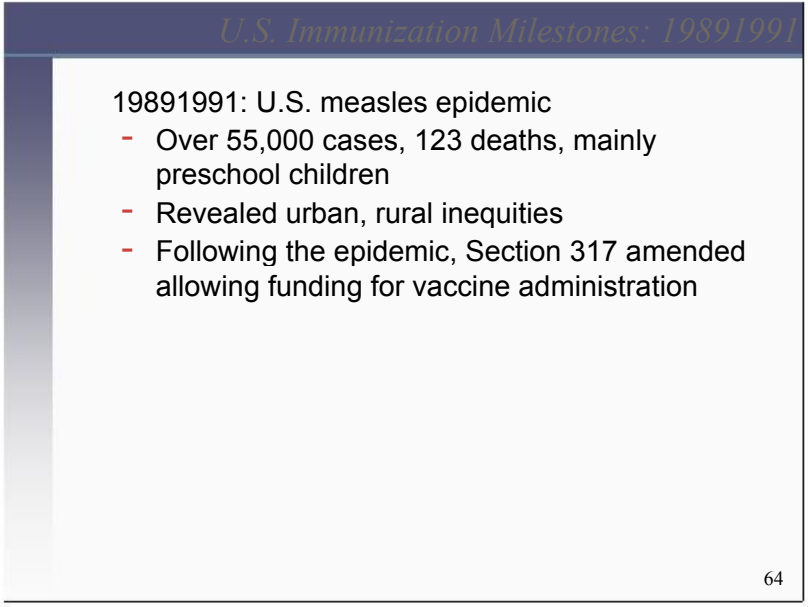
19651989

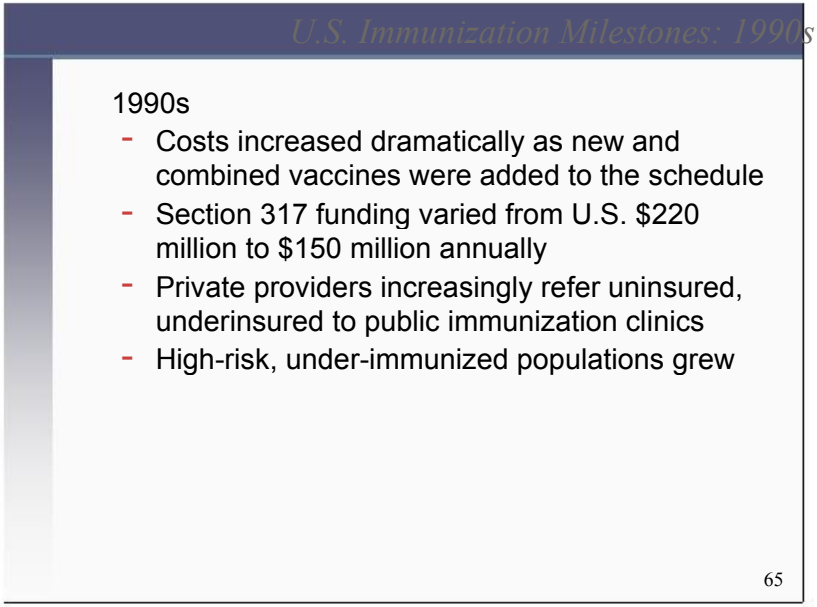
- Five inexpensive vaccines in use: smallpox, DPT, IPV, OPV, measles
- Half of vaccinations were given in private, half in public sector

1986: National Childhood Vaccine Injury Compensation Program instituted

- Federal government indemnifies vaccine manufacturers from legal liability for vaccine adverse events

63


U.S. Immunization Milestones: 19891991
19891991: U.S. measles epidemic
- Over 55,000 cases, 123 deaths, mainly preschool children
- Revealed urban, rural inequities
- Following the epidemic, Section 317 amended allowing funding for vaccine administration
64



U.S. Immunization Milestones: Vaccines for Children Act

1993: Vaccines for Children Act

- Federal entitlement to free vaccines for uninsured, underinsured, poor children
- Government purchases vaccines directly on recommendations from CDCs Advisory Committee on Immunization Practices, not subject to annual Congressional approval
- Allowed privatization: vaccinations in medical home
- By 1996, VFC providers covered >75% U.S. children
- In 2002, the private sector purchased 43% of all childrens vaccines; VCA purchased 41%; and state/local governments purchased the rest

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U.S. Scorecard

Positives

- Vaccine coverage at an all-time high
- No measles circulating since 2000
- Registries reaching 44% of children

Negatives

- Just 65% of adults age 65 and over receive influenza and pneumococcal vaccines
- Persistent racial, ethnic disparities in coverage
- Vaccine shortages since 2000

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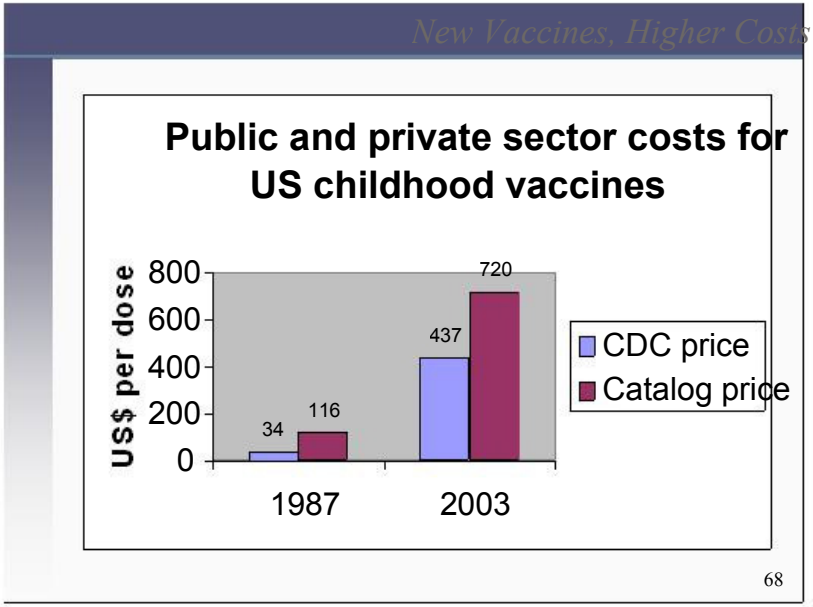

Case Study: Pneumococcal Vaccine

Hinman et al (2004) analyzed the impacts of introducing pneumococcal vaccine (PCV7) to the U.S. schedule in 2000

PCV7 doubled public sector vaccine costs

By 2003, Section 317, other public funding, were inadequate to meet costs

19 states turned to a two-tier system

- VFC-eligible children continued to receive PCV7; others could not

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Conceptualize Determinants

- 53% of children under five have private insurance immunization benefit (Institute of Medicine, 2003)
- Fluctuations in Section 317 funding reduce public sector immunization delivery for the remainder of children
- Section 317 funding cannot be used to reimburse private immunization providers
- Even costlier vaccines are on the way

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IOM (2003) Interventions

As out-of-pocket costs rise, providers shift patients to public facilities, parents abandon the schedule

To remedy the situation, the IOM (2003) recommended:

- A government-subsidized mandate to all public and private health plans to provide all recommended vaccines
- Subsidies to cover these additional costs, based on the societal benefits and costs of each vaccine (value-based pricing)
- Vouchers for uninsured populations

The federal government has yet to implement these IOM recommendations

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Summary

- Global inequities in the availability and affordability of immunizations persist
- The advent of new vaccines has dramatically increased costs
- The poorest countries have little prospect of meeting these costs themselves
- Market incentives for vaccine manufacturers are weak

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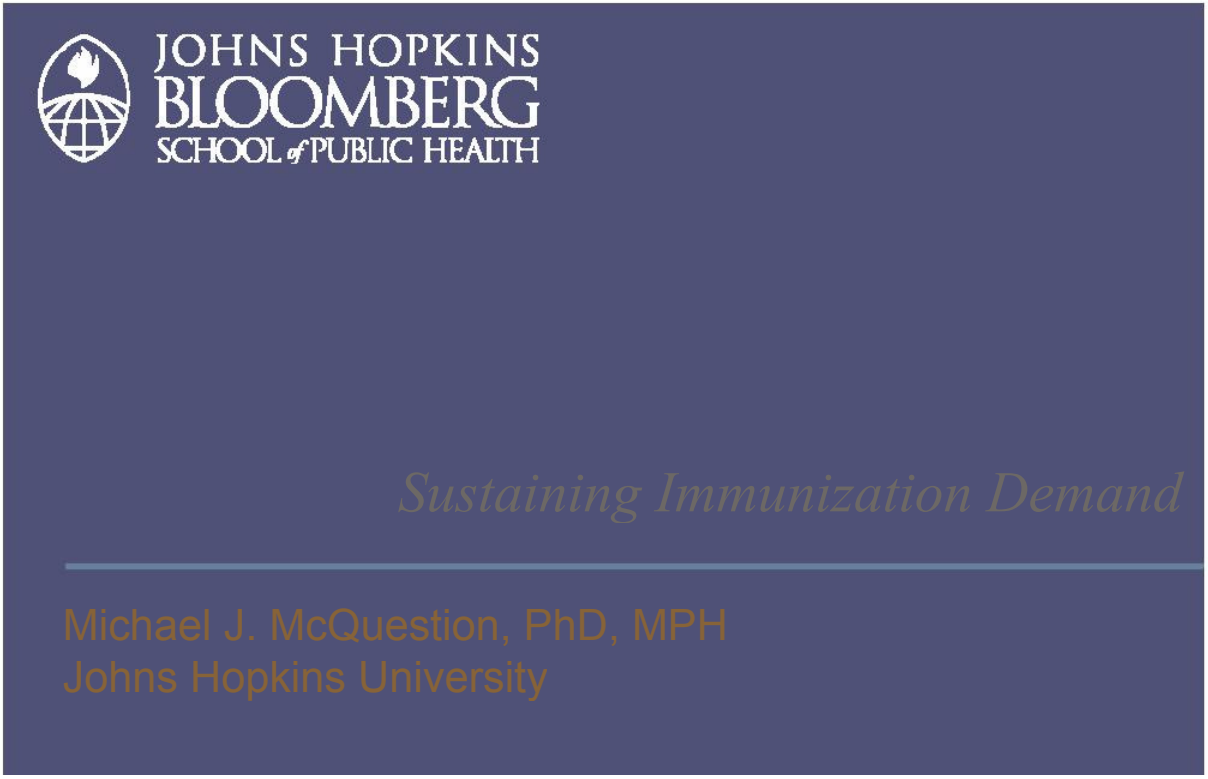
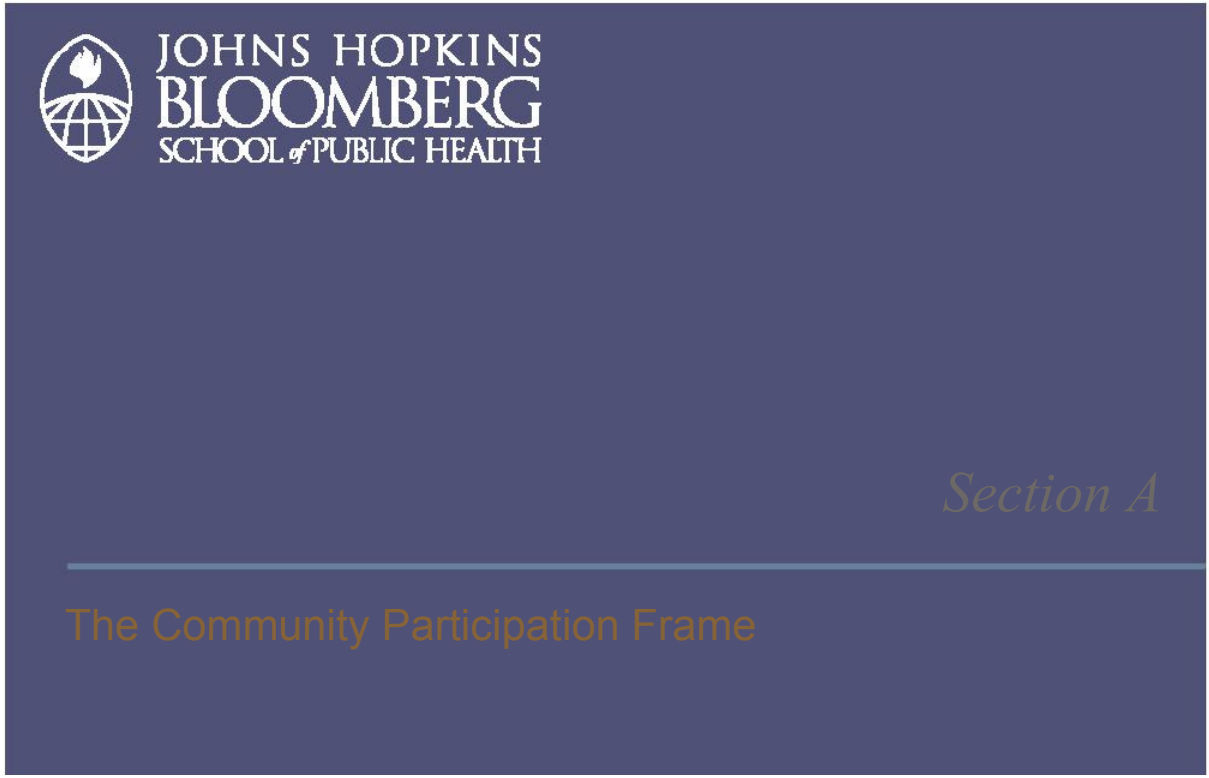


Objectives

After listening to, viewing, and studying the lecture materials in this course, you will be able to do the following:

- Understand demand-side determinants of immunization program sustainability
- Relate vaccination safety to vaccination rejection
- Identify ethical principles for collective immunization programs

2



Community Participation

the process by which members of the community, either individually or collectively and with varying levels of commitment:

- Develop the capability to assume greater responsibility for assessing their health needs and problems
- Plan and then act to implement these solutions
- Create and maintain organizations in support of these efforts
- Evaluate the effects and bring about necessary adjustments in goals and programmes on an ongoing basis

Source: WHO, 1991

Continued 4

Community Participation

Community participation is the cornerstone of primary health care

Some examples weve studied in this course:

- Census-based Bolivian model
- Bamako Initiative
- Polio eradication

The decentralization strategy assumes community participation will accompany local control over health resources

As Azfar et al (2002) concluded, it is precisely the lack of community participation that jeopardizes decentralized immunization

pregnancy at least in
pregnancy stages

Continued 5

Community Participation

In their review article, Zakus and Lysack (1998) state that community participation:

- Ranges from passive to active depending on context
- Is not well understood conceptually or technically
    - Informal local leaders acting naturally
    - The right community representatives
    - Results if health workers meet needs

6

Community Input

7

Formal Community Health Organizations

They identify the following success factors for formal community health organizations:

- Significant community input
- Positive links to local government
- Members share goals, expectations
- Accountability, transparency
- Some training investment
- Represents all community groups

8

The Original Alma-Ata Conceptualization

The original Alma-Ata conceptualization assumes that community participation is:

- Continuous
- Autonomous
- Voluntary
- Empowering
- Egalitarian
- Universally feasible

9

Reconceptualizing Community Participation

Applying principles of social learning, community participation:

- Needs some heterogeneity to work
- Involves similar actors modeling each others behaviors and personal standards
- Reflects prevailing social norms
- Intrinsically rewards participants
- Rapidly diffuses prosocial behaviors
- Transforms social structures

Continued 10

Reconceptualizing Community Participation

Applying the principles of collective action, community participation:

- Needs some heterogeneity to work
- Involves self-interested actors
- Requires a discrete, measurable goal
- Must involve every member
- Is short-term in nature
- May have an expressive dimension

Continued 11

Reconceptualizing Community Participation

Summarizing, external agents can facilitate community participation by:

- Providing appropriate symbolic representations and highlighting actual examples of desired behaviors
- Helping identify attainable goals
- Providing regular progress reports
- Recognizing desired behaviors using peer processes
- Exchanging actors across communities
- Keeping all actors involved

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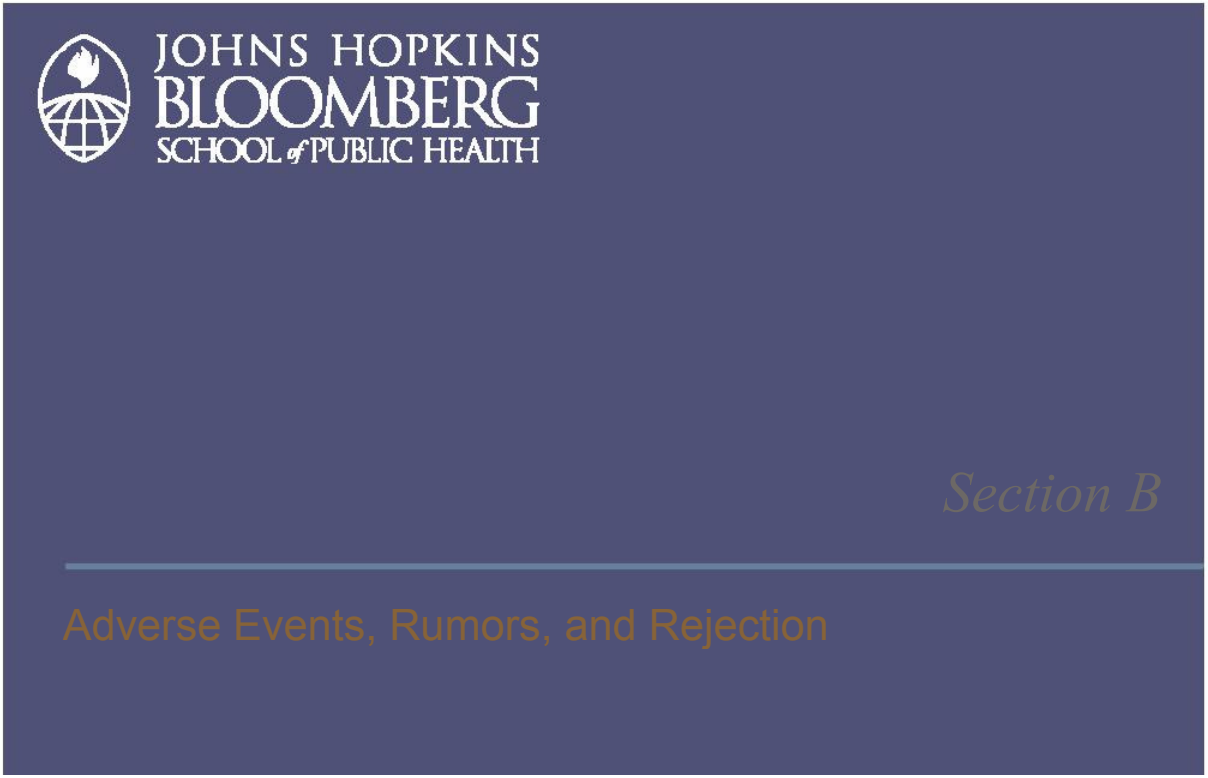

Adverse Events

There is always a probability of adverse events following immunization (AEFI)

Following WHO (2004), AEFIs may be due to:

- Inherent properties of the vaccine (vaccine reaction)
- Errors in administration (program error)
- Coincidence
- Anxiety (injection reaction)

Mild vaccine reactions are commonplace, but serious vaccine reactions are quite rare

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Vaccine Reactions

Mild event rates for specific vaccinations

vaccine	local reaction	fever	irritability, discomfort
Hib	5-15%	2-10%	-
Hepatitis B	<= 30% children <=5% adults	1-6%	-
Measles/MMR	<= 10%	<=5%	-
OPV	none	<1%	<1%
TT/DT	<=10%	<=50%	<=60%
DTP	<=50%	<=50%	<=60%
BCG	common	-	-

Source: Data from PAHO, 2002

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Manufacturer Quality Control

- Vaccine producers must meet rigorous manufacturing practices
- WHO and government regulatory authorities (NRAs) assure quality and certify each vaccine according to strict standards
- NRAs test and release each lot of vaccine and maintain post-marketing surveillance
- Manufacturers increasingly conduct clinical trials and cooperate in AEFI surveillance in-country

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Program Errors

Most adverse events are due to human error in the field

- Using non-sterile syringes
- Recycling used syringes and needles
- Hand contamination of vaccine or diluent
- Reconstitution with the wrong diluent
- Improper administration
  - For example, BCG given subcutaneously instead of intradermally

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Frequency of Adverse Events

During large-scale immunization campaigns, the frequency of AEFIs may increase, but the rate of occurrence stays the same

Example: consider a country giving 100,000 doses of measles vaccine annually

- Expected: 12 sore arms/100,000 doses
- Routine EPI: we observe 1 sore arm/month
- Week-long catch-up campaigns (say 80% coverage): we observe 910 sore arms/week

Higher frequency may generate negative publicity

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Disposal of Sharps

To maximize safety, WHO, UNICEF, and UNFPA issued a joint recommendation in 1999 that all countries should use auto-destruct syringes

This increases the problem of safely disposing of used needles and syringes

Each district is expected to:

- Have its own sharp disposal plan
- Routinely report on use of sharps disposal boxes at each health facility offering vaccinations

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Vaccine Safety Monitoring

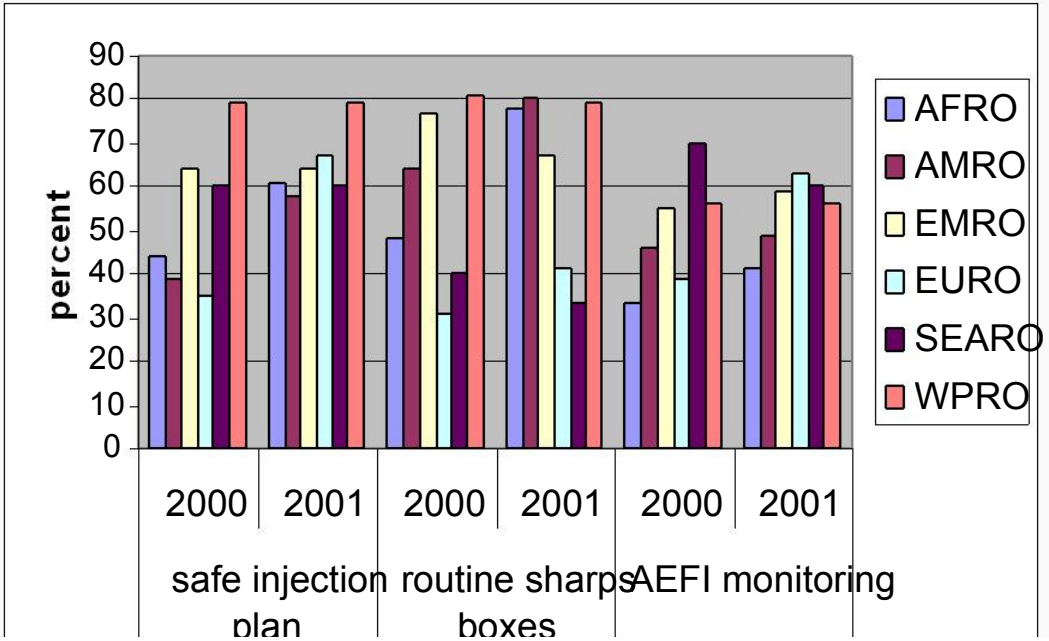
The WHO/UNICEF joint EPI reporting system routine monitors these indicators:

- Number of countries with safe injection plans down to district level
- Number of countries using auto-destruct syringes
- Number of countries routinely distributing sharps boxes with all vaccine deliveries
- The methods of sharps waste management recommended in each country
- Number of countries with AEFI monitoring systems

systems

20

Selected WHO/UNICEF Vaccine Safety Indicators



21

Quality of Care

The steady improvements in vaccine safety indicators show that countries are devoting more attention to this aspect of quality of care

Much of the improvement can be attributed to GAVI grants to the lowest-income countries

Popular perceptions of the quality of immunization services affects acceptance

22

Resistance Due to Waning Incidence

Popular awareness of vaccine-preventable diseases and their severity declines as the numbers of cases decline

Popular movements occasionally arise against specific vaccines

Gangarosa et al (1998) compared pertussis incidence in a set of countries where anti-vaccine movements successfully stopped pertussis immunization to another set where there were no such movements

23

Pertussis in the U.K.

Results

- Pertussis recrudesced in the countries where vaccination was stopped

Example: United Kingdom 19741978

- Vaccine coverage fell from 80% to 30%
- An outbreak of over 100,000 cases followed
- Popular outcry led to reinstitution of pertussis vaccination

Continued 24

Disinformation

Another dimension of the problem

- Internet sites offering incorrect, biased, or misinformation

WHOs Global Advisory Committee on Vaccine Safety has developed criteria for judging the veracity of Web sites

- Credibility
- Content
- Accessibility
- Design

http://www.who.int/immunization_safety/safety_quality/vaccine_safety_websites/en/

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Resistance and Community Demand

Nichter (1995) studied rapid immunization efforts in Asia and Africa

He saw that communities exhibited either active demand or passive acceptance of immunization

- Active demand

  Public is informed, knows risks, benefits

- Passive acceptance

  Public merely complies, yields to external pressure to immunize

Continued 26

Resistance and Community Demand

Nichter also observed frequent resistance to vaccination

Resistance is usually based on rumors and fears

- Or is an opportunity for political dissent

Vaccination has been associated with Westernization, sterilization, and Christianization

Rumors accompany rapid immunization efforts such as polio eradication campaigns

27

Case Study: Polio Vaccination in Nigeria

EPI performance had been deteriorating in Nigerias predominantly Muslim northern states

National polio immunization campaigns were held in 2002

On the advent of the 2003 campaigns, local Muslim leaders advised the population to shun polio OPV vaccine because they believed it contained sterilizing agents

Continued 28

Case Study: Polio Vaccination in Nigeria

The Nigerian government formed a special safety verification committee consisting of scientists and traditional leaders

The committee, with WHO support, tested similar OPV lots in use in India and South Africa

In March, 2004, the committee concurred that the OPV was safe

Renewed special immunization activities followed, emphasizing education, informed consent

Cost: 491 polio cases in Nigeria, spread of wild poliovirus to nine adjacent countries

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Resistance and Community Demand

Vaccination acceptance, (Nichter,1995) depends on:

- The quality of immunization services
  - Communication, education
  - Faith in local health workers
- Social factors
  - Gender discrimination
  - Norms
- Cultural perceptions of vaccination, illnesses
  - Knowledge of immunity, pathogenesis
  - Logic of prevention
  - Specificity

Specificity

Of

Linkage to local illness names, categories

vaccines

30

Ethics of Vaccination

Verweij and Dawson (2004) consider the ethics of collective immunization programs, asking:

- How should the inclusion of new vaccines be decided.
- Under what conditions is compulsory immunization acceptable.

Inevitable conflict between an individuals rights and societys interests with immunization

They formulated seven ethical principles for collective immunization programs

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Seven Ethical Principles

1. Only serious diseases are targeted
2. Each vaccine, the EPI itself, must be safe and effective
3. Burdens on individuals are minimized
4. Program burden/benefit ratio is favorable relative to alternative programs
5. Benefits and burdens are justly distributed
6. Voluntary participation is the goal but compulsory immunization is sometimes warranted
7. Public trust must be honored, protected

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Summary

Adverse events following immunization are inevitable

- Most are not serious
- All require close monitoring and investigation

Countries are increasingly emphasizing vaccine safety

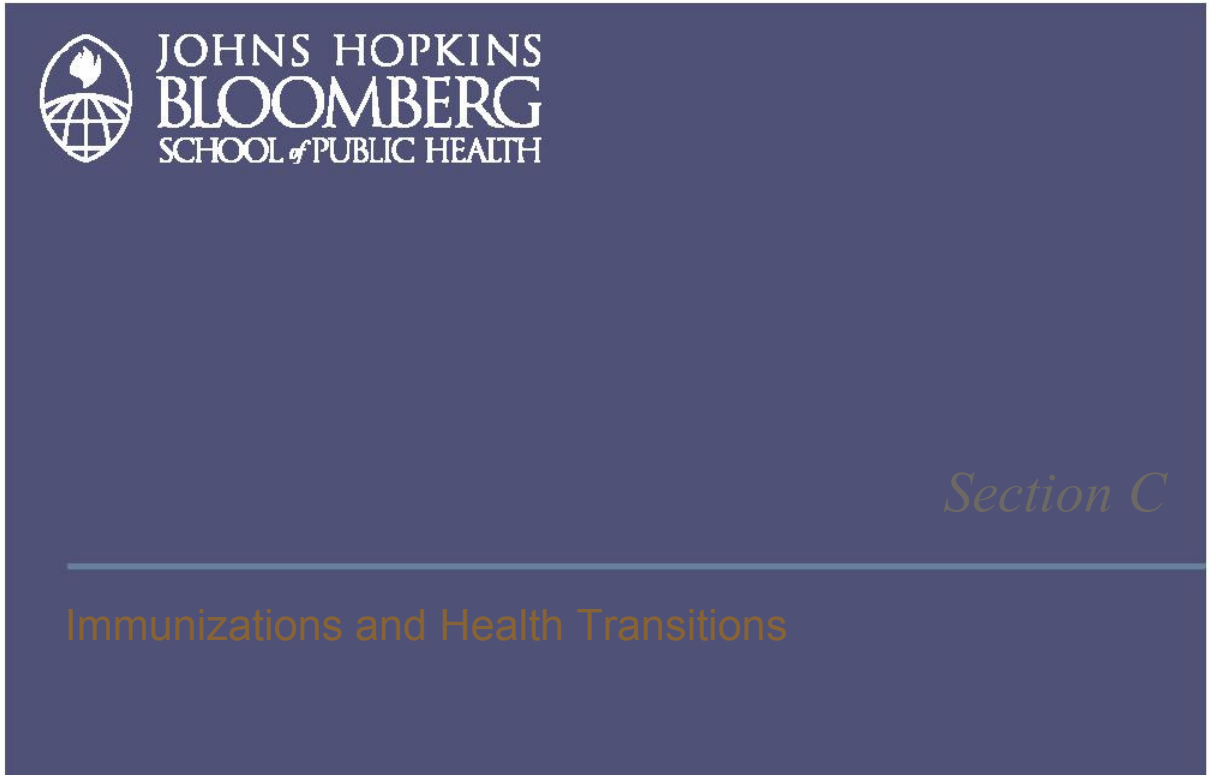
Adverse events and low quality of care can spawn rumors, rejection of immunization

Sustainability is possible when communities exhibit active demand versus passive acceptance of immunization

Sustainability of collective

immunization programs depends on maintaining high ethical principles

33



Health Transition

Health transition

- the cultural, social and behavioral determinants of health: that is, those determinants other than medical interventions and income

35

Immunization as a Social Institution

A sustainable immunization program is a set of ongoing relationships among:

- Clients and health workers
- Members of a community
- Health workers, supervisors, managers
- Managers, policymakers, donors, political leaders

All cooperate to provide the public good of an immunized society

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Risk

There is an element of risk

- Not all actors know one another
- Defection by any actor could lead to costly epidemics

An immunization program is therefore an exercise in **trust**, argues Gilson (2002)

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Trust

Trust may have calculative or emotional roots, argues Gilson (2002)

- We trust one another because it will secure some benefit
- We trust one another because it is the right thing to do
- In any case, trust is learned behavior
- Over time, it generates common values and norms of obligation

Continued 38

Trust

Concepts associated with trust include:

- Competence: the health worker knows what she is doing
- Openness: she will tell me all I need to know
- Concern: she cares about me, my family, our community
- Reliability: she is there when I need her

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Impersonal Trust

An immunization program is a social institution in which actors invest impersonal trust in one another

Trust-based institutions lower the risks of trusting strangers through:

- Monitoring and disciplinary procedures
- The faceless commitments embodied in their expert systems (Giddens 1990)

40

Institution-Based Trust

Institution-based trust is a specific response to the complexity of modern societies, adds Gilson

- Without it, immunization programs would not be feasible
- With it, immunization programs measurably reduce mortality and add to economic productivity

41

Generalized Trust

The social norms underlying interpersonal trust are built into the institution over time

When a trust-based institution embodies social norms relevant to its actors, it can promote generalized trust in other citizens of that society

- In this way, a trust-based immunization program contributes to development in a civic sense

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Macro-Level Trust

This macro-level trust is built on micro-level trust: the client-provider and provider-manager relationships

- The trust built up between provider and client (facework commitments) reinforces trust in the system
- Trust among health staff and across health institutions reduces transaction costs

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Immunization as a Social Institution: Conclusion

High quality of care and high-trust relationships among providers therefore contribute to:

- Inducing individual behavioral change
- Enabling collective action

Conclusion

- Given trust, people want to participate in EPI both for their own health and to contribute to the collective good

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Case Study: Uganda

Continued 45

Case Study: Uganda

Birungi (1998) described some negative outcomes that accompanied disruptions of Ugandas Expanded Programme on Immunization in the early 1990s

Observing a deterioration in quality of care, Ugandans took to self-administering their injections

This mistrust in health institutions has increased the risk of HIV transmission

Continued 46

Case Study: Uganda

Health workers themselves defected and adopted unsafe injection practices

Birungi identifies the symptoms of deteriorating trust

- Health workers mistreated clients
- Clients doubted health workers were following safe injection standards
- Lay people have appropriated the skills
- Rumors about risks of injection were rife

Continued 47

Case Study: Uganda

Peoples faith in immunization as an expert system had been shaken

They now seek domesticated therapies, provided by individuals they personally know

If they have to visit a health center, clients seek a provider they know

Continued 48

Case Study: Uganda

To re-instill trust in the expert knowledge system, Birungi proposes:

- Health workers invite injection users into the health centers and let them participate in sterilization procedures
- Health-worker retraining in proper injection and sterilization techniques
- A public health campaign advising of the dangers of unsafe injections

49

Update on Ugandas EPI: Editorial Notes

A peak 82% of Ugandan children 1223 months were fully immunized in 1995

Coverage then slipped to 62% in 2001

Using mass campaigns, Uganda interrupted polio transmission in 1997

In 2000, Uganda received a GAVI grant which included funds for disposable syringes and injection disposal equipment

50

Northern Manhattan Immunization Partnership

Northern Manhattan Immunization Partnership, New York City

Findley et al (2003) describe a five-year community-based effort to raise immunization rates in a low-income area of New York City

The team worked with local immunization providers (n=8) to improve their clinic performance

- Semi-annual AFIX reviews, report cards
- Flowsheets, recalls, and reminders
- Immunization registry

Continued 51

Northern Manhattan Immunization Partnership

They also engaged community organizations (n=20) in systematic outreach activities to reach young children

The outreach strategies included:

- Paid outreach workers
- Bilingual educational materials
- Coordination with Women, Infants, and Children (WIC) and State Child Health Insurance (SCHIP) Programs
- A detailed community action plan

Continued 52

Northern Manhattan Immunization Partnership

Outreach strategies

- Regular visits to churches, tenant associations, day care centers
- Home visits to dropouts
- Health education for parents
- Ongoing process evaluation
  - Feedback to and from community organizations, providers

Continued 53

Northern Manhattan Immunization Partnership

Evaluation

- Studied four annual cohorts of children ages 6 24 months (1996, 1997, 1999, 2000)
- Compared randomly sampled clinic charts to the annual National Immunization Survey results for New York City

Result

- Local coverage increased 3.4% per year faster than national, citywide rates

Initial coverage increase (1997) was attributed to improved provider performance

By 1999, improvements were due to

promotion and
outreach by the community organizations

54

Conclusion

An immunization program exemplifies a societys response to its health needs

The response must include:

- Sustainable, high-quality services
- Health promotion and education
- Community engagement

To the extent these conditions are met, the program contributes to a nations health transition

Problem Solving for Immunization Programs
Professor Michael McQuestion

Reading List

Lecture 1 Required

Bonanni, Paulo. Demographic Impact of Vaccination: A Review. Vaccine 17 (1999) S120 - S125.

CDC. Morbidity and Mortality Weekly Report. February 8, 2002 / Vol. 51 / No. RR-2.

Cutts, Felicity T. Vaccination in the 21st Century New Funds, New Strategies. Tropical Medicine and International Health Volume 5 no 3 pp 157159 March 2000.

Shearley, Adelaide E. The Societal Value of Vaccination in Developing Countries. Vaccine 17 (1999) S109 - S112.

Lecture 1 Recommended

Henderson, D. A. Lessons from the Eradication Campaigns. Vaccine 17 (1999) S53 - S155.

CDC. Morbidity and Mortality Weekly Report. April 2, 1999 / Vol. 48 / No. 12

CDC. National, State, and Urban Area Vaccination Coverage Among Children Aged 19-35 Months -- United States, 2003. July 30, 2004 / 53(29); 658-661.

US, National Immunization Survey, 2003. Estimated Vaccination Coverage with Individual Vaccines and Selected Vaccinations Series Among Children 19-35 Months of Age by State And Immunization Action Plan Area.

WHO. State of the Worlds Vaccines and Immunization. 2002. http://www.who.int/vaccines-documents/.

Lecture 2 Required

Davis, Matthew M., Mitesh S. Patel and Achamyeleh Gebremariam. Decline in Varicella-Related Hospitalizations and Expenditures for Children and Adults After Introduction of Varicella Vaccine in the United States. *Pediatrics* 2004;114;786-792. http://www.pediatrics.org/cgi/content/full/114/3/786

Luman, Elizatbeth T., MS, Shannon Stokley, MPH, Danni Daniels, MS, R. Monina Klevens, DDS, MPH. Vaccination Visits in Early Childhood Just One More Visit To Be Fully Vaccinated. Am J Prev Med 2001; 20(4S).

Onta, S.R., Sabroe, S. and Hansen, E.H. The Quality of Immunization Data from Routine Primary Health Care Reports: A Case from Nepal. Health Policy and Planning; 13(2): 131-139.

San Sabastian, Miguel DTM&H MsC, Isabel Goicolea MD, Jaime Aviles, Mauricio Narvaez. Improving Immunization Coverage in Rural Areas of Ecuador: A Cost-Effectiveness Analysis. Tropical Doctor, 2001, 31, 21-24.

Smith, Philip J., PhD, Michael P. Battaglia, MA, Vicki J. Huggins, MS, David C. Hoaglin, PhD, Ann-Sofi Roden, MBA, Meena Khare, MS, Trena M. Ezzati-Rice, MS, Robert A. Wright, MA. Overview of the Sampling Design and Statistical Methods Used in the National Immunization Survey. Am J Prev Med 2001;20(4S).

Lecture 2 Recommended

Bolton, Paul, MBBS MPH SCM; Elizabeth Holt, DRPH; Alan Ross, PhD; Nancy Huchart, RN MPH; Bernard Guyer, MD MPH. Estimating Vaccination Coverage Using Parental Recall, Vaccination Cards, and Medical Records. Public Health Rep 1998; 113: 521-526.

Fuchs, Victor R. Economics, Values, and Health Care Reform. The American Economic Review, Volume 86, Issue 1 (March 1996), 1-24.

Graves, P. M. Comparison of the Cost-effectiveness of Vaccines and Insecticide Impregnation of Mosquito Nets for the Prevention of Malaria. Annals of Tropical Medicine & Parasitology, Vol. 92, No. 4, 399 410 (1998).

Lieu, Tracy A., MD, MPH G. Thomas Ray, MBA, Steven B. Black, MD, Jay C. Butler, MD, Jerome O. Klein, MD, Robert F. Breiman, MD, Mark A. Miller, MD, Henry R. Shinefield, MD. Projected Cost-effectiveness of Pneumococcal Conjugate Vaccination of Healthy Infants and Young Children. JAMA, March 15, 2000Vol 283, No. 11.

National Health and Nutrition Examination Survey (nhanes.) CDC. http://www.cdc.gov/nchs/nhanes.htm .

Lecture 3 Required

Barnes, Katie, CPNP, MSc, MPH; Stephen M. Friedman, MD, MPH;

Barnes, Katie, CPNP, MSc, MPH, Stephen M. Friedman, MD, MPH, Phd, Judy Honig, CPNP, EdD. Impact of Community Volunteers on Immunization Rates of Children Younger Than 2 Years. Arch Pediatr Adolesc Med. 1999;153:518-524.

Briss, Peter A., MD, Lance E. Rodewald, MD, Alan R. Hinman, MD, MPH, Abigail M. Shefer, MD, Raymond A. Strikas, MD, Roger R. Bernier, PhD, Vilma G. Carande-Kulis, MS, PhD, Hussain R. Yusuf, MBBS, MPH, Serigne M. Ndiaye, PhD, Sheree M. Williams, PhD, The Task Force on Community Preventive Services. Reviews of Evidence Regarding Interventions to Improve Vaccination Coverage in Children, Adolescents, and Adults Am J Prev Med 2000;18(1S).

The LATH Consortium of Deloitte Touche Tohmatsu Emerging Markets (DTTEM), Euro Health Group (EHG) and Liverpool Associates in Tropical Health (LATH). How to Prepare for a Data Quality Audit Briefing Paper. The Global Alliance for Vaccines and Immunizations.

Perry, Henry, Nathan Robison, Dardo Chavez, Orlando Taja, Carolina Hilari, David Shanklin, and John Wyon. The Census-based, Impact-oriented Approach: Its Effectivenss in Promoting Child Health in Bolivia. HEALTH POLICY AND PLANNING; 13(2): 140-151.

Technet 2001. New Delhi Consultation Report. Technet 2001.

Lecture 3 Recommended

WHO. Weekly Epidemiological Record. 14 February 2003, 78th Year. No. 7, 2003, 78, 41-48 http://www.who.int/wer .

WHO. Safe Disposal of Syringes and Needles in the Context of Health Care Waste Management Systems. WHO, 2003.

Lecture 4 Required

PAHO. EPI Newsletter Expanded Programs on Immunization in the Americas. Volume XXII, Number 5, October 2000.

Roush, Sandy, MT, MPH; Siiri Bennett, MD; Hayley Hughes, MPH; Melinda Wharton, MD, MPH. Chapter 16: Enhancing Surveillance. VPD Surveillance Manual, 3 rd Edition, 2002, Chapter 16, Enhancing Surveillance: 16 1.

Singh, Jagvir, Jain, D. C., Sharma, R. S., and Verghese, T. Further Observations on Comparison of Immunization Coverage by Lot Quality Assurance Sampling and 30 Cluster Sampling. Southeast Asian J Trop Med Public Health, Vol 27, No. 2, June 1996.

Stewart, J. C., Schroeder, D. G., Marsh, D. R., Allhasane, S., and Kone, D. Assessing a Computerized Routine Health Information System in Mali Using LQAS. HEALTH POLICY AND PLANNING, 16(3): 248-255.

Lecture 4 Recommended

Coetzee, D. J., Ferrinho, P., and Reinach, S. G. A Vaccination Survey Using the EPI Methodology to Evaluate the Impact of a Child Health Outreach Programme in an Urban Area of South Africa. Bulletin of the World Health Organization, 71 (1): 33-39 (1993).

LQA Tool. Ward Form Tetanus Toxoid Immunization of Women.

Macintyre, Kate. Rapid Assessment and Sample Surveys: Trade-offs in Precision and Cost. HEALTH POLICY AND PLANNING; 14(4): 363373.

Tawfik, Youssef, Shamsul Hoque, & Mizan Siddiqi. Using Lot Quality

Tawfik, Youssef, Shamsul Hoque, & Mizan Siddiqi. Using Lot Quality Assurance Sampling to Improve Immunization Coverage in Bangladesh. Bulletin of the World Health Organization, 2001, 79 (6).

WHO. Weekly Epidemiological Record. 1995, 70, 261-268.

WHO. Monitoring Immunization Services Using Lot Quality Technique. 1996.

WHO. Description and Comparison of the Methods of Cluster Sampling and Lot Quality Assurance Sampling to Assess Immunization Coverage. 2001.

Lecture 5 Required

Cutts, F. T., Zell, E. R., Soares, A. C., and Diallo, S. Obstacles to Achieving Immunization for All 2000: Missed Immunization Opportunities and Inappropriately Timed Immunization. Journal of Tropical Pediatrics, Vol. 37, August 1991.

Charles W. LeBaron, MD; J. Todd Mercer, MPH; Mehran S. Massoudi, PhD, MPH; Eugene Dini, MPA; John Stevenson, MA; Wayne M. Fischer, MPH; Herbert Loy; Lori Stonehocker Quick, RN, MSN; John C. Warming; Pat Tormey, RN, MPH; M. DesVignes-Kendrick, MD, MPH. Changes in Clinic Vaccination Coverage After Institution of Measurement and Feedback in 4 States and 2 Cities. Arch Pediatr Adolesc Med. 1999;153:879-886.

Robinson, J. Stephen, Barton R. Burkhalter, Barbie Rasmussen, & Ristianto Sugiono. Low-cost on-the-job Peer Training of Nurses Improved Immunization Coverage in Indonesia. Bulletin of the World Health Organization, 2001, 79 (2).

Lecture 5 Recommended

CDC. Core Elements for AFIX Training and Implementation. April 2004. http://www.cdc.gov/nip/afix .

Bobo, Janet Kay, PhD, James L. Gale, MD, Purushottam B. Thapa, MBBS, and Steven G. F. Wassilak, MD. Risk Factors for Delayed Immunization in a Random Sample of 1163 Children from Oregon and Washington. PEDIATRICS Vol. 91, No. 2 February 1993.

Dietz, Vance J.,, MD; Andrew L. Baughman, MPH; Eugene F. Dini, MPA; John M. Stevenson, MA; Bennett K. Pierce, MS; James C. Hersey, PhD; for the Georgia Immunization Program Evaluation Team. Vaccination Practices, Policies, and Management Factors Associated With High Vaccination Coverage Levels in Georgia Public Clinics. Arch Pediatr Adolesc Med. 2000;154:184-189.

Dini, Eugene F., Michael Chaney, Ronald L. Moolenaar, and Charles W. LeBaron. Information as Intervention: How Georgia Used Vaccination Coverage Data to Double Public Sector Vaccination Coverage in Seven Years. J Public Health Management Practice, 1996, 2(1), 45-49.

Fielding, Jonathan E., MD, MPH, MBA; William G. Cumberland, PhD; Lynn Pettitt, RPh, MPH. Immunization Status of Children of Employees in a Large Corporation. JAMA, February 16, 1994 Vol. 271, No. 7.

Hughart, RN, MPH, Donna Strobino, PhD, Elizabeth Hold, DRPH, Bernard Guyer, MD, MPH, William Hou, MS, Ashraful Huq, MBBS, MPH, and Alan Ross, PhD. The Relation of Parent and Provider Characteristics to Vaccination Status of Children in Private Practices and Managed Care Organizations in Maryland. Medical Care, January 1999, Vol. 37, No. 1.

Szilagyi, Peter G. and Lance E. Rodewald. Missed Opportunities for Immunizations: A Review of the Evidence. J Public Health Management

the Evidence. J Public Health Management
Practice, 1996, 2(1), 18-25.
Taylor James A., MD; Paul M. Darden, MD; Eric Slora, PhD; Cynthia M. Hasemeier; Linda Asmussen; and Richard Wasserman, MD, MPH. The Influence of Provider Behavior, Parental Characteristics, and a Public Policy Initiative on the Immunization Status of Children Followed by Private Pediatricians: A Study From Pediatric Research in Office Settings. PEDIATRICS Vol. 99 No. 2 February 1997.

Lecture 6 Required

Boyd, Terry D., MS, Robert W. Linkins, MPH, PhD, Keith Mason, AS, Igor Bulim, BBA, Brenda Lemke, MHA. Assessing Immunization Registry Data Completeness in Bexar County, Texas. Am J Prev Med 2002;22(3).

Chambers, Christopher V., MD, Donald J. Balaban, MD, MPH, Barbara L. Carlson, MA, and Donald M. Grasberger. The Effect of Microcomputer-Generated Reminders on Influenza Vaccination Rates in a University-Based Family Practice Center. JABFP. Jan. Feb. 1991, Vol. 4, No. 1.

CDC. Morbidity and Mortality Weekly Report. May 28, 2004 / Vol. 53 / No. 20.

Shannon Stokley, MPH; Lance E. Rodewald, MD; and Edmond F. Maes, PhD. The Impact of Record Scattering on the Measurement of Immunization Coverage. PEDIATRICS Vol. 107 No. 1 January 2001.

Wilcox, Sarah A., PhD, Christopher P. Koepke, PhD, Robert Levenson, MBA, and Judith C. Thalheimer. Registry-Driven, Community-Based Immunization Outreach: A Randomized Controlled Trial. September 2001, Vol 91, No. 9 | American Journal of Public Health.

Lecture 6 Recommended

Horne, Philip R., BS, Kristin N. Saarlas, MPH, Alan R. Hinman, MD, MPH. Costs of Immunization Registries Experiences from the All Kids Count II Projects. Am J Prev Med 2000;19(2).

Irigoyen, Matilde M., MD; Sally Findley, PhD; Beryl Earle, RN, PhD; Kevin Stambaugh; and Roger Vaughan, DrPH. Impact of Appointment Reminders on Vaccination Coverage at an Urban Clinic. PEDIATRICS Vol. 106 No. 4 October 2000.

Karen C. Lee, MD; Jonathan A. Finkelstein, MD, MPH; Irina L. Miroshnik, MS; Donna Rusinak, BS; Jeanne M. Santoli, MD, MPH; Susan M. Lett, MD, MPH; Tracy A. Lieu, MD, MPH. Pediatricians Self-reported Clinical Practices and Adherence to National Immunization Guidelines After the Introduction of Pneumococcal Conjugate Vaccine. ARCH PEDIATR ADOLESC MED/VOL 158, JULY 2004.

Lynch, Mauricea Lima. The Uptake of Childhood Immunization and Financial Incentives to General Practitioners. Health Economics, Vol. 3: 117-125 (1994).

Mullooly, J., L. Drew, F. DeStefano, R. Chen, K. Okoro, E. Swint, V. Immanuel, P. Ray, N. Lewis, C. Vadheim, M. Lugg, and the Vaccine Safety DataLink Team. American Journal of Epidemiology Vol. 149, No. 2, 1999.

National Immunization Program. Immunization Registry Minimum Functional Standards. 15 May 2001.

Smith, Robin E. and Alvin N. Eden. Assessing Immunization Rates in an Ambulatory Care Setting. Journal of Urban Health: Bulletin of the New York Academy of Medicine, Vol. 79, No. 2. June 2002

2002.

Popovich, Michael, Robert Conn, Michael Garcia, Terrance Hughes, Todd Watkins. White Paper: Five Lessons Learned Implementing Statewide Immunization Information Systems and Where Do Registries Go From Here. WHP021A December 2001.

Olin, P. Vaccination Programmes out of Pace with Vaccine Development: A Call for National Vaccination Registers. ACTA PDIATR 88 (1999)

Szilagyi, Peter G., MD, MPH, Clayton Bordley, MD, MPH, Julie C. Vann, PhD, MS, RN, Ann Chelminski, MD, Ronald M. Kraus, EdM, Peter A. Margolis, MD, PhD, Lance E. Rodewald, MD. Effect of Patient Reminder/Recall Interventions on Immunization Rates A Review. JAMA, October 11, 2000Vol 284, No. 14.

Lecture 7 Required

Laxmi Bilas Acharya and John Cleland. Maternal and Child Health Services in Rural Nepal: Does Access or Quality Matter More. HEALTH POLICY AND PLANNING; 15(2): 223229.

Vandemoortele, Jan, Denis Broun, and Rudolf Knippenberg. Epilogue. INT. J. HEALTH PLANN.-MGMT. Vol. 12, Suppl. 1, S165-S168 (1997).

Knippenberg, Rudolf, Eusebe Alihonou, Agnes Soucat, Kayode Oyegbite, Maria Calivis, Ian Hopwood, Reiko Niimi, Mamadou Pathe Diallo, Mamadou Conde, and Samuel Ofosu-Amaah. Implementation of the Bamako Initiative: Strategies in Benin and Guinea. INT. J. HEALTH PLANN.-MGMT. VOL. 12, SUPPL. 1, S29S47 (1997).

Perry, Henry, Robert Weierbach, Shams El-Arifeen, and Iqbal Hossain. A Comprehensive Assessment of the Quality of Immunization Services in One Major area of Dhaka City, Bangladesh. Tropical Medicine and International Health Vol. 3, No. 12, 981-992, December 1998.

Silverman, Myrna, Martha Ann Terry, Richard Kent Zimmerman, Jean F. Nutini, Edmund M. Ricci. The Role of Qualitative Methods for Investigating Barriers to Adult Immunization. QUALITATIVE HEALTH RESEARCH, Vol. 12 No. 8, October 2002 1058-1075.

Lecture 7 Recommended

Evans, David B., Tessa Tan-Torres Edejer, Jeremy Lauer, Julio Frenk, and Christopher J. L. Murray. Measuring Quality: From the System to the Provider. International Journal for Quality in Health Care 2001; Volume 13, Number 6: pp. 439-446.

Mariko, Mamadou. Quality of Care and the Demand for Health Services in Bamako, Mali: The Specific Roles of Structural, Process, and Outcome Components. Social Science & Medicine (2002).

Perrin, Edward B., PhD. Some Thoughts on Outcomes Research, Quality Improvement, and Performance Measurement. MEDICAL CARE Volume 40, Number 6, Supplement pp III-89III-91.

Streefland, P.H, A.M.R. Chowdhury, & P. Ramos-Jimenez. Quality of Vaccination Services and Social Demand for Vaccinations in Africa and Asia. Bulletin of the World Health Organization, 1999, 77 (8).

Thomas, Stephen, James R. Killingsworth, and Shambhu Acharya. User Fees, Self-Selection and the Poor in Bangladesh. HEALTH POLICY AND PLANNING; 13(1): 50-58.

Lecture 8 Required

Bandura, Albert. Social Learning Theory. Prentice Hall, Inc. Englewood Cliffs, NJ, 1977. Chapters 2-6.

Bhattacharyya, Karabi and John Murray. Community Assessment and Planning for Maternal and Child Health Programs: A Participatory Approach in Ethiopia. Human Organization, Vol. 59, No. 2, 2000.

Olson, Mancur. A Theory of Groups and Organizations.

Perez-Cuevas, Ricardo, Hortensia Reyes, Ulises Pego, Patricia Tome, Karla Ceja, Sergio Flores, Gonzalo Gutierrez. Immunization Promotion Activities: Are They Effective in Encouraging Mothers to Immunize Their Children. Social Science & Medicine 49 (1999) 921-932.

Zimmerman, Richard Kent, MD, MPH, Mary Patricia Nowalk, PhD, RD, Inis J. Bardella, MD, Michael J. Fine, MD, MSc, Janine E. Janosky, PhD, Tammy A. Santibanez, PhD, Stephen A. Wilson, MD, Mahlon Raymund, PhD. Physician and Practice Factors Related to Influenza Vaccination Among the Elderly. Am J Prev Med 2004;26(1).

Lecture 8 Recommended

Bastien, Joseph W. Cross Cultural Communication of Tetanus Vaccinations in Bolivia. Soc. Sci. Med. Vol. 41, No. 1, pp. 77-86, 1995.

Bunton, Robin, Simoa Murphy, and Paul Bennett. Theories of Behavioral Change and Their Use in Health Promotion: Some Neglected Areas. Health Education Research. Vol. 6, No. 2, pp. 153-162, 1991.

Coreil, Jeannine, Antoine Augustin, Neal A. Halsey, and Elizabeth Holt. Social and Psychological Costs of Preventive Child Health Services in Haiti. Soc. Sci. Med. Vol. 38, No. 2, pp. 231-238, 1994.

Gore, Prasanna, Suresh Madhavan, David Curry, Gordon McClung, Mary Castiglia, Sidney A. Rosenbluth, Raymond A. Smego. Predictors of Childhood Immunization Completion in a Rural Population. Social Science & Medicine 48 (1999) 1011-1027.

Haaland, Ane and Carol Vlassoff. Introducing *Health Workers for Change*: From Transformation Theory to Health Systems in Developing Countries. HEALTH POLICY AND PLANNING; 16(Suppl. 1): 16.
Noack, Horst. The Role of Socio-structural Factors in Health Behavior. 1988.

Rosenstock, Irwin M., PhD, Victor J. Strecher, PhD, MPH, and Marshall H. Becker, PhD, MPH. Social Learning Theory and the Health Belief Model. Health Education Quarterly Vol. 15(2): 175-183 (Summer 1988).

Strobino, Donna, PhD; Virginia Keane, MD; Elizabeth Holt, DrPH; Nancy Hughart, RN, MPH; and Bernard Guyer, MD, MPH. Parental Attitudes Do Not Explain Underimmunization. PEDIATRICS Vol. 98 No. 6 December 1996.

Weinstein, Neil D. Testing Four Competing Theories of Health-Protective Behavior. Health Psychology, 1993, Vol. 12, No. 4, 324-333.

Lecture 9 Required

Aylward, R. B., H. E. Hull, S. L. Cochi, R. W. Sutter, J. M. Olive. Disease

Aylward, R. B., H. F. Hull, S. L. Cochi, R. W. Sutter, J.-M. Olive. Disease Eradication As a Public Health Strategy: A Case Study of Poliomyelitis Eradication. Bulletin of the World Health Organization, 2000, 78(3).

Heymann, David L., MD, and R. Bruce Alyward, MD. Eradicating Polio. New England Journal of Medicine 351; 13. 23 September 2004.

CDC. Morbidity and Mortality Weekly Report. 28 May 2004 / Vol. 53 / No. 20.

CDC. Morbidity and Mortality Weekly Report. 25 June 2004 / Vol. 53 / No. 24.

Nsubuga, Peter, Sharon McDonnell, Bradley Perkins, Roland Sutter, Linda Quick, Mark White, Stephen Cochi, and Mac Otten. Polio Eradication Initiative in Africa: Influence on Other Infectious Disease Surveillance Development. BMC Public Health 2002, 2:27 This article is available from: http://www.biomedcentral.com/1471-2458/2/27 .

Lecture 9 Recommended

Andrianarivelo, M. Rakoto, P. Boisier, L. Rabarijaona, M. Ratsitorahina, R. Migliani and H. Zeller. Mass Vaccination Campaigns to Eradicate Poliomyelitis in Madagascar: Oral Poliovirus Vaccine Increased Immunity of Children Who Missed Routine Programme. Tropical Medicine and International Health volume 6 no 12 pp 1032-1039 December 2001.

Geoffard, Pierre-Yves, and Tomas Philipson. Disease Eradication: Private versus Public Vaccination. The American Economic Review, Volume 87, Issue 1 (Mar., 1997), 222-230.

Polio News. Issue 21. March 2004.

Roberts, Leslie. Polio: The Final Assault. Science Magazine, Vol. 303. 26 March 2004.

CDC. Weekly Epidemiological Record. No. 27, 2002, 77, 221228.

CDC. Weekly Epidemiological Record. No. 9, 2002, 77, 6976.

WHO. Global Polio Eradication Initiative Progress 2003.

Lecture 10 Required

de Quadros, Ciro A., Hector Izurieta, Linda Venczel, and Peter Carrasco. Measles Eradication in the Americas: Progress to Date. The Journal of Infectious Diseases 2004; 189(Suppl 1):S22735.

Guris, Dalya, Rafael Harpaz, Susan B. Redd, Natalie J. Smith,a and Mark J. Papania. Measles Surveillance in the United States: An Overview. The Journal of Infectious Diseases 2004; 189(Suppl 1):S17784.

Hutchins, Sonja S., Ruth Jiles, and Roger Bernier. Elimination of Measles and of Disparities in Measles Childhood Vaccine Coverage among Racial and Ethnic Minority Populations in the United States. The Journal of Infectious Diseases 2004; 189:S14652.

CDC. Morbidity and Mortality Weekly Report. 13 August 2004/ Vol. 53 / No. 31.

Lecture 10 Recommended

Di Fabio, Jose Luis and Ciro de Quadros. Considerations for Combination Vaccine Development and Use in the Developing World. Clinical Infectious Diseases 2001; 33(Suppl 4):S3405.

Hinman, Alan R., Walter A. Orenstein, and Mark J. Papania. Evolution

Hinman, Alan R., Walter A. Orenstein, and Mark J. Papania. Evolution of Measles Elimination Strategies in the United States. The Journal of Infectious Diseases 2004; 189(Suppl 1):S1722.

Hinman, A. Eradication of Vaccine-Preventable Diseases. Annu. Rev. Public Health. 1999. 20:211 29.

CDC. Morbidity and Mortality Weekly Report. 2 July 2004 / Vol. 53 / No. 25.

Orenstein, Walter A., Mark J. Papania, and Melinda E. Wharton. Measles Elimination in the United States. The Journal of Infectious Diseases 2004; 189(Suppl 1):S13.

Strebel , Peter M., Ana-Maria Henao-Restrepo, Edward Hoekstra, Jean-Marc Olive, Mark J. Papania, and Stephen L. Cochi. Global Measles Elimination Efforts: The Significance of Measles Elimination in the United States. The Journal of Infectious Diseases 2004; 189(Suppl 1):S2517.

Guris, Dalya MD MPH. Module on Best Practices for Measles Surveillance. World Health Organization 2001.

Lecture 11 Required

Bonua, Sekhar ,Manju Rani, Oliver Razum. Global Public Health Mandates in a Diverse World: The Polio Eradication Initiative and the Expanded Programme on Immunization in Sub-Saharan Africa and South Asia. Health Policy 70 (2004) 327345.

Vaccination in Bogota in the Context of the Decentralisation and Reform of the Health System in Colombia. Europe and the Americas Forum on Health Sector Reform. 2002.

GAVI. Update on Country Level GAVI & Vaccine Fund Related Activities. 1 November 2004.

Muraskin, William, PhD. The Global Alliance for Vaccines and Immunization: Is It a New Model for Effective PublicPrivate Cooperation in International Public Health. American Journal of Public Health | November 2004, Vol 94, No. 11.

National Vaccine Advisory Committee. Strengthening the Supply of Routinely Recommended Vaccines in the United States. JAMA, December 17, 2003 Vol. 290, No. 23.

Lecture 11 Recommended

Batson, Amie and Matthias M. Bekier. Vaccines Where Theyre Needed. The McKinsey Quarterly 2001 Number 4: Emerging Markets.

Bloom, Gerald. Equity in Health in Unequal Societies: Meeting Health Needs in Contexts of Social Change. Health Policy 57 (2001) 205224.

Brugha, Ruair, Mary Starling, and Gill Walt. GAVI, the First Steps: Lessons for the Global Fund. THE LANCET Vol. 359, February 2, 2002.

Costello, A. and H. White. Reducing Global Inequalities in Child Health. Arch Dis Child 2001; 84:98102.

Gilson, Lucy, Denny Kalyalya, Felix Kuchler, Sally Lake, Hezron Oranga, and Marius Ouendo. The Equity Impacts of Community Financing Activities in Three African Countries. International Journal of Health Planning and Management 2000; 15: 291-317.

Azfar, Omar, Satu Khknen, and Patrick Meagher. Conditions for

Azfar, Omar, Satu Kähkönen, and Patrick Meagher. Conditions for Effective Decentralized Governance: A Synthesis of Research Findings. 13 March 2001.

Khaleghian, Peyvand. Decentralization and Public Services: The Case of Immunization. Social Science & Medicine 59 (2004) 163183.

Woodle, Dian. Vaccine Procurement and Self-Sufficiency in Developing Countries. HEALTH POLICY AND PLANNING; 15(2): 121129.

Zhao, Zhen, PhD, Ali H. Mokdad, PhD, and Lawrence Barker, PhD. Impact of Health Insurance Status on Vaccination Coverage in Children 1935 Months Old, United States, 19931996. Public Health Reports / MarchApril 2004 / Volume 119.

CASA

Bulim, Igor CDC National Immunization Program. File Import Specifications to Link Immunization Registries/Patient Management Systems to the Clinic Assessment Software Application (CASA) Version 2.X. July 2001.

Minnesota Department of Health Immunization, Tuberculosis and International Health Section. Using CASA to Do the Chart Review. January 2001.

Lecture 12 Required

Bardenheier, Barbara, MPH, MA; Hussain Yusuf, MBBS, MPH; Benjamin Schwartz, MD, MPH; Deborah Gust, PhD; Lawrence Barker, PhD; Lance Rodewald, MD, MPH. Are Parental Vaccine Safety Concerns Associated With Receipt of Measles-Mumps-Rubella, Diphtheria and Tetanus Toxoids With Acellular Pertussis, or Hepatitis B Vaccines by Children. Arch Pediatr Adolesc Med. 2004; 158:569-575.

Findley, Sally E., PhD, Matilde Irigoyen, MD, Donna See, MPH, MBA, Martha Sanchez, BA, Shaofu Chen, MD, PhD, Pamela Sternfels, MS, and Arturo Caesar, MD, MPH. Community-Provider Partnerships to Reduce Immunization Disparities: Field Report From Northern Manhattan. American Journal of Public Health July 2003, Vol. 93, No. 7.

Gilson, Lucy. Trust and the Development of Health Care as a Social Institution. Social Science & Medicine 56 (2003) 14531468.

Nichter, Mark. Vaccinations in the Third World: A Consideration of Community Demand. Soc. Sci. Med. Vol. 41, No. 5, pp. 617-32, 1995.

Ulmer, Jeffrey B. and Margaret A. Liu. Ethical Issues for Vaccines and Immunization. Immunology Vol. 2, April 2002.

Lecture 12 Recommended

Birungi, Harriet. Injections and Self-Help: Risk and Trust in Ugandan Health Care. Soc. Sci. Med. Vol. 47, No. 10, pp. 1455-1462, 1998.

Gangarosa, E. J., A. M. Galazka, C. R. Wolfe, L. M. Phillips, R. E. Gangarosa, E. Miller, R. T. Chen. Impact of Anti-Vaccine Movements on Pertussis Control: The Untold Story. THE LANCET Vol. 351 January 31, 1998.

Gust, Deborah A., PhD, MPH; Tara W. Strine, MPH; Emmanuel Maurice, MS; Philip Smith, PhD; Hussain Yusuf, MBBS, MPH; Marilyn Wilkinson, ScD; Michael Battaglia, MA; Robert Wright, BS; and Benjamin Schwartz, MD. Underimmunization Among Children: Effects of Vaccine Safety Concerns on Immunization Status. PEDIATRICS

Concerns on Immunization Status. PEDIATRICS
Vol. 114 No. 1 July 2004.
Morgan, Lynn M. Community Participation in Health: Perpetual Allure, Persistent Challenge. PEDIATRICS Vol. 114 No. 1 July 2004.

Mosquera, M., Y. Zapata, K. Lee, C. Arango, and A. Varela. Strengthening User Participation through Health Sector Reform in Colombia: A Study of Institutional Change and Social Representation. HEALTH POLICY AND PLANNING; 16(Suppl 2): 52-60.

PAHO/WHO. Immunization Safety: How to Address Events Allegedly Attributable to Vaccination or Immunization. 2002. http://www.paho.org .

UNICEF. Combatting Antivaccination Rumours: Lessons Learned from Case Studies in East Africa.

WHO. Vaccines and Biologicals Aide Mmoire. http://www.who.int/vaccines/ .

Woo, Emily Jane, MD, MPH, Robert Ball, MD, MPH, ScM, Ann Bostrom, PhD, Sean V. Shadomy, DVM, MPH, Leslie K. Ball, MD, MPH, Geoffrey Evans, MD, and Miles Braun, MD, MPH. Vaccine Risk Perception Among Reporters of Autism After Vaccination: Vaccine Adverse Event Reporting System 19902001. American Journal of Public Health June 2004, Vol. 94, No. 6.

Zakus, J. David L. and Catherine L. Lysack. Revisiting Community Participation. HEALTH POLICY AND PLANNING; 13(1): 1-12.